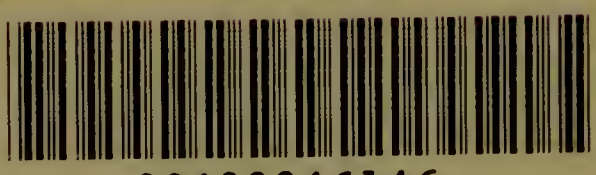
MANUAL OF HEALTH & TEMPERANCE

BRODRIBB & PYM



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BY

T. BRODRIBB, M.A.

SECRETARY TO THE EDUCATION DEPARTMENT, VICTORIA.

WITH

EXTRACTS FROM "GOUGH'S TEMPERANCE ORATIONS."

COMPILED, REVISED, AND EDITED BY THE

REV. W. RUTHVEN PYM, M.A.

VICAR OF SHARROW, SHEFFIELD.

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PREFACE.

THIS handbook on Health and Temperance is designed to meet a widely felt want in our elementary schools. The history of its compilation needs a few words of explanation. The groundwork of the book is due to Mr. T. Brodribb, M.A., Secretary to Education Department, Victoria, who was anxious to meet the requirements of the Amending Education Act passed by the Legislature of Victoria in 1889.

The Sheffield School Board, in search of a sound and acceptable Temperance Reader, intrusted to me the task of finding one. Mr. Brodribb's book, along with many others, came into my hands, and commended itself to me as a most useful book for our purpose. It deals with the Temperance question on broad lines, as one of many questions affecting health. It deals also with it from the moral, social, and economic points of view.

Having regard, however, to the widespread and disastrous results of intemperance in our own country, it seemed to me that an even stronger appeal to our scholars to put one of life's most fatal temptations out of their path by becoming teetotallers, on grounds of safety, expediency, and Christian considerateness for others, might well find a place in the book. Carefully chosen extracts from "Gough's Temperance Orations" admirably supply

this want, and at the same time from their rhetorical character they form an excellent variation from the other parts of the book for the purposes of a reading lesson.

We are greatly indebted to Mr. Brodribb for kindly allowing us to adapt his book to our purpose, to Messrs. Morgan & Scott, the publishers of "Gough's Orations," for their courtesy in permitting us to use the extracts, and to Dr. Springthorpe, M.A., for the chapters upon "Infectious Diseases," and "Accidents and Emergencies."

It only remains for me to add that this book goes forth with the unanimous sanction of the members of the Sheffield School Board, who sincerely hope that it will be found to answer the purpose for which it is intended. In the name of its publishers, our enterprise has a guarantee of acceptance as a work of distinct educational value.

W. RUTHVEN PYM

(Member of the Sheffield School Board).

Sharrow Vicarage, Sheffield,
September, 1892.

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INTRODUCTION.

At certain times existence itself is a pleasure to us; mind and body are at their best, and capable of effort with little fatigue, while work or exercise affords a glow of satisfaction and gives a relish to life. The warm sunshine, the rough wind, the sharp frosty air, all alike are felt to be vivifying or bracing, and each in its kind is found enjoyable. At such times we are in what is called a condition of bodily health. It would be more easy to make plain what health is not than what it is; but this, at least, may be said that health consists in freedom from pain, in a proper working of the bodily organs, and in a capacity for physical exertion. On the other hand, health is impaired and the vital strength is weakened through any lessening in the power of the bodily organs. Thus, if the heart's action be weakened, if the lungs cannot work properly, if the organs of digestion fail in their office, the living force of the body is lessened, illness results, and, if unchecked, life is cut off or, at least, shortened; for indeed the human body may be considered as an engine that can work

properly only when its several parts are in good order. The stomach may be called the furnace, the lungs the boiler, the heart the cylinder; and if any of these, or even less important parts of the machinery, get out of gear, feebleness, pain, and incapacity for work set in—the state that we call illness.

Two sciences are concerned with the protection of health —medicine and hygiene. Medicine, or the healing art, is the study which deals with illness or disease in any form; and for the safety of the public the practice of medicine is rightly restricted to trained and capable men who make it their special profession; while hygiene, or the science of health, aims not at the direct treatment of disease, but by wise foresight seeks its prevention. Thus, the care of fever patients in a town would be a task for medical science; while the draining of that town, the isolation of cases of infection, the removal of matter dangerous to health, and, in short, all steps taken to prevent future ravages of fever, would be called a sanitary or hygienic duty.

The poet Pope, in summing up the factors of happiness, says—

"All the joys of sense
Lie in three words: Health, Peace, and Competence."

Health he puts first, and not without reason; for it is plain that abounding wealth can give scanty satisfaction, that intellectual pleasures will fail, and social enjoyments will be of little account, when the body is suffering from pain and weakness. Such suffering, indeed, seems more or less the heritage of mankind; yet so much of it is owing to folly or misconduct, that if men could be induced to lead wiser and better lives a great deal of disease

which now afflicts or even destroys them might be averted. Hygiene, the science of health, lays down certain principles to guide us in these matters; and it is divided into public and private hygiene. The former is the subject of Government or of municipal regulation, with the end of seeing that we are not hurt by the imprudence of our neighbours, and that certain large works are properly carried out, such as the cleansing of streets or the sewerage of towns, and such other sanitary undertakings as could not or would not be carried out by the individual. With matters of this kind this book will have little to do, its subject being mainly private hygiene, or the personal care of health.

Nothing is more certain than that many deaths occur from causes which are wholly preventable. If we read the published returns of the causes of death, we shall find a large proportion of the whole, sometimes as much as one-fourth or one-sixth, to be diseases of the fever type, caused chiefly by bad drainage or the non-removal of filth. In ancient times many causes of pestilence existed that happily have now been removed. Dwelling-rooms, now so clean and well kept, were once filthy underfoot. Instead of carpets, a litter of rushes covered the floor, affording harbourage for filth and vermin. When the upper layer of rushes became dirty, it was covered with a fresh layer of clean rushes instead of being removed. Roads were not properly made, and sometimes became receptacles for the worst refuse of the houses; while personal cleanliness received far less attention than it does at the present day. Is it, therefore, wonderful that pestilences, which find their birth-spots and homes in dirt, should often

have arisen? Every now and then an appalling plague would break out, and kill many thousands of people, but even these stern lessons made people but little wiser in sanitary matters. Thus in the fourteenth century the awful scourge of the "Black Death" ravaged Europe, Asia, and Africa, destroying, it is said, some millions of people in Europe alone, including from a third to half the population of England. In the fifteenth and sixteenth centuries came visitations of the "Sweating Sickness," and the following century witnessed the appalling "Great Plague of London." Both of these diseases were begotten of uncleanliness. London in 1665 had half-a-million of inhabitants—only a fragment of its present mighty population; and yet the great plague destroyed 68,596 of its people. At different times during the present age, cholera has ravaged Europe; and, as is well known, it spares well-drained, healthy dwellings, and attacks the crowded insanitary hovels of the poor. There was once a case in Norwich where the cholera ravaged one side of a street, scarcely any house escaping, while the other side almost wholly escaped. Investigation showed that the healthy side of the street drained away from the houses, while on the unhealthy side the drainage soaked towards the houses and stagnated under them.

Infectious diseases are spread by germs, and these germs find homes in cess-pits, refuse heaps, dust on walls, and generally in dirt of all kinds; but by disinfecting, by cleansing our houses and streets, by the burning of refuse, and by other suitable precautions, we are able to fight the insidious foes which lurk in dark corners, poisoning the life-blood of a nation, and bringing in their train the cruel accompaniments of sorrow and distress.

CHAPTER I.

AIR.

THE first necessity of man is air. He might for days be deprived of food, drink, and sleep, and yet survive; but not for even five minutes could he exist if wholly deprived of air.

Air is a mixture of two gases—oxygen and nitrogen—with a slight admixture of carbonic acid gas. More than 20 parts out of 100 of the mixture are oxygen, while 79 of them consist of nitrogen. About 4 parts in 10,000 are composed of carbonic acid gas, and when this proportion rises to 6 or 7 the air becomes very unhealthy. A varying small quantity of watery vapour is also to be found in the atmosphere.

Nitrogen is marked by its negative character; it cannot support life or combustion, and it has no taste, smell, or colour. Its office in air appears to be to dilute the oxygen, and to check its force and activity.

Oxygen, in combination with other elements, is far and away the most abundant thing in nature; but in its pure state it consists of a colourless gas, without taste or smell, possessed of properties of great importance. Thus, without its presence no animal can breathe, no light can burn; and, though it is the efficient cause of fermentation, rust, and putrefaction, it yet possesses the power of rendering

harmless certain organic germs that are found to be the most common and the most deadly enemies against which man has to fight.

But, although oxygen is the element that sustains fire and life, its action is too violent for ordinary conditions, and it is therefore diluted with four times its bulk of nitrogen. This latter gas, as before remarked, has neutral properties; fire, light, and life are not supported by it. As a constituent of air, it is inhaled into the lungs, and then breathed out again without perceptible change, in which respect it differs widely from its vigorous companion, oxygen.

Oxygen alone, however, will not sustain life—an animal put into a jar of oxygen gas has thereby its vital powers abnormally stimulated, and it soon dies; while combustion is wonderfully promoted, as is readily seen from the brilliant experiment of introducing into a jar of oxygen, a lighted match or a piece of red-hot wire. In the latter case not only is a brilliant light given out, but the wire itself actually burns away, so powerful is the combustion of almost anything in pure oxygen. For its share of the work in breathing and burning, nitrogen (so to speak) puts the break on, in order to prevent an injurious hurrying of natural processes.

We may now consider the special office of oxygen in relation to the act of breathing, and how it works in our lungs.

The lungs are two large spongy elastic organs, wrapped each in a moist membranous covering. The windpipe, protected by a little valve called the epiglottis, designed to keep out food and other substances, leads down to the lungs from nostrils and mouth, and then branches into two tubes called bronchi. Each bronchus passes into a lung,

and as it goes on it ramifies into very many minute tubes, to which air-cells are attached; while around these air-cells are a vast number of most minute blood-vessels (the capillaries), through which the blood that needs purifying has to pass.

At the moment of inspiration, the ribs expand upwards and outwards, the diaphragm (a strong muscle dividing heart and lungs from stomach and intestines) presses downwards, and, the breathing space being thus enlarged, air rushes in and inflates the lungs.

In the act of expiration certain muscles draw the ribs together and downwards, and the diaphragm is raised; hence the space for retaining air is lessened, so that the air that was taken in is now expelled, carrying with it impure air which must be immediately got rid of, or otherwise life would cease. As the result of each inspiration, the air that is taken in comes into proximity with impure blood in the capillaries; some of its oxygen passes through the thin walls of the capillaries, and, uniting with the carbon of the blood, forms **carbonic acid gas.** This gas passes into the lungs and is breathed out with the expired air; while if any absolute obstruction occurs, as in drowning or strangulation, death occurs in about three minutes.

This union of the carbon and oxygen is a kind of slow combustion, and evolves heat. Thus, two great objects are effected by this one function; breathing provides the heat needed for the human body, and also rids the system of impurities. We can now see why exercise makes us warm even in cold weather. Exercise causes a quickening of the breathing, and an immense increase in the quantity of air inspired; the consequence being that more oxygen is burned and more carbonic acid

is got rid of, so that, in the greatly augmented degree in which the union of carbon and oxygen takes place in the capillaries, a correspondingly greater degree of bodily heat is produced. From these facts we may draw the useful deduction that constriction of the lungs is to be carefully avoided, such as may be caused by tight clothing, a slouching gait, or by stooping over a desk or table.

Bodily heat varies in different animals. Thus in the leech it is 77° Fahrenheit, in the frog 70°, in the turtle 86°, in man nearly 98½°, but in the horse it is 100°, in the ox 101°, in the dog 102°, the temperature of the sheep and goat is 104°, that of fowls and ducks mounts up to 108°, and in the pigeon it is as high as 109°.

In health the bodily temperature is maintained always at the same degree, whatever may be the external conditions. Hence in summer or winter, in Greenland or Ceylon, in the fierce heat of tropical Australia or among the icebergs of the Southern Ocean, the heat of man's body is steadily maintained at 98·4° F. Should his temperature get above this, it shows a state of fever, and in case of its rising to 102° or 103° considerable danger may be indicated. On the other hand, should the normal heat of the body be lessened for any length of time death from inanition must follow. The body is starved through lack of the heat necessary to keep the system going, and it perishes.

In high latitudes deaths from cold are not uncommon—the body, chilled into torpor, perishing in unconsciousness. The writer knew two young men who were lost through failure of vital power in this way. They were in the water on a cold day, clinging for hours to a water-logged boat waiting for the help that did not come until too late. Their

frames were chilled and powerless with long exposure; and, although unusually strong swimmers, when at last a wave swept them off, they had no power left with which to make an effort to save themselves. Similarly, persons, though not drowned in shipwreck, sometimes perish through long exposure to cold and wet, the vital force being so lowered that unconsciousness and death ensue.

Thus, one important function of the lungs is the **maintenance of the animal heat**; the other, and even more important one, being the **removal of waste and impure matter from the body.** When air is inspired it contains nearly 21 per cent. of oxygen; but when this air is breathed out the proportion is altered to 16·2, nearly 5 per cent. of oxygen having been used up in purifying the blood and in sustaining the bodily heat. As may be expected, the quantity of carbonic acid in the air breathed out is greatly increased; for, while in the inspired air the proportion was about 4 parts in 10,000, it is now not less than 430.

Breath expired is therefore poisonous, and we all know that when a number of people are massed together, in an ill-ventilated hall or theatre, the atmosphere becomes close and oppressive. Who has not felt a sickening sensation on going into an unventilated bedroom which a sleeper has just quitted, and where, in fact, he has been poisoning himself with his own breath? Consumption and other kinds of disease may be the result of persons being poisoned in this way. The terrible instance, in 1756, of the "Black Hole of Calcutta" will occur to every mind. Here, in a room 20 feet square, 146 Englishmen were shut in for the night! There was only one small window; and so insufficient was the supply of air that the unhappy

prisoners were poisoned with the carbonic acid from their own bodies, and only twenty-three of them were found alive next morning. The survivors were so weakened by the terrible night they had spent, that many of them died shortly afterwards.

Many years ago in the London Barracks for the household troops it was found that the mortality of the Foot Guards was nearly double that of the Horse Guards; but, by allowing extra space and by improved ventilation, the great disparity disappeared.

Another instance from the army may be given. During winter time, throughout the Crimean War, the British troops suffered great hardships through dwelling in tents in severely cold weather, and wooden huts were therefore sent out for their comfort. But, unfortunately, the huts designed for the soldiers' comfort increased their mortality, because the men closed up every aperture through which a stream of cold air could penetrate, and thereby they stopped ventilation.

Carbonic acid is produced not only by our breathing, but also by fermentation and combustion. At certain times it is dangerous to go into a large wine-vat to clean it; and a man has been known to lose his life through entering such a vat where a quantity of this deadly gas had been generated. Under such circumstances persons quickly become unconscious and die.

The "choke-damp" of mines, which has caused so many deaths, consists of accumulations of carbonic acid lurking in remote and unventilated recesses. Then again, combustion, by its union of carbon and oxygen, rapidly creates carbonic acid. An ordinary gas-burner will produce from

three to six times the quantity of carbonic acid that would be given out by the lungs of an adult.

Some years ago a case occurred where two women, who shared the same bedroom, took up on a very cold night an iron bucket full of burning coals. Their room had no chimney, and, door and window being closed, there was no ventilation. The result of the excessive production of carbonic acid in their room was that in the morning one woman was found dead, while the other, who was unconscious, was with difficulty restored to life.

But in impure air there are other evils than an excess of carbonic acid. **Dust** of all kinds is breathed into the lungs, laying a foundation for consumption, and in bad cases rapidly shortening life. One of the most dangerous forms of this is from the inhalation of steel dust in the dry grinding of cutlery. Other very injurious forms are from stone-dust, affecting masons; and from hair-dust, wool-dust, flour-dust, and ordinary dust likewise. Contrary to popular belief, there is good authority for thinking that coal dust is not injurious to health.

Dust inhaled is not only matter that may clog the action of the lungs and bring on pulmonary disease, but it may act as the carrier of poisonous germs. Hence the reason for removing dust from walls, shelves, and floors. Sweeping, indeed, is not always a satisfactory operation, as it stirs up dust, and loads the air with the finer particles of it. For this reason sweeping is often more safely performed with a damp mop or a patent roller-brush. As dust is so often the carrier of poison germs, we see the force of the sanitary recommendation which enjoins us to burn the contents of the dust-pan.

The atmosphere further becomes a receptacle for various **other impurities**; and from lungs and skin, from sewers, drains, cesspools, ditches, and decaying matter, are given off watery vapour, ammonia, and organic matters injurious to health; for they are often the cause of typhoid fever, scarlet fever, blood poisoning and other diseases.

One of the great evils of an excess of carbonic acid in the air is, that as the proportion of this gas increases so also increases the capacity of the air for holding hurtful fever germs and other dangerous matter. It is said that one-fourth of the total mortality in England is due to diseases of the respiratory organs, most of these being caused by the inhalation of impure air.

A few exact statements must be made regarding the **capacity of the lungs,** the quantity of air breathed out, and the means of replenishing it. Breathing is more rapid in the young than in the old; but a man may be assumed to breathe about 18 times in the minute, and to send out at each expiration about 30 cubic inches of air, of which 1·29 cubic inch is carbonic acid, this being equal to 16·1 cubic feet of carbonic acid in 24 hours; and this quantity contains about $7\frac{1}{2}$ ounces of carbon—in other words, charcoal. Thus, the human chest expands and contracts upwards of 20,000 times in the 24 hours, making every minute $3\frac{1}{2}$ cubic feet of air impure, or 210 cubic feet for every hour. Except in the rare cases, when the temperature of the air is about 98°, the air expired is lighter than the surrounding air, and therefore rises, being pushed up by the heavier air sinking around it.

We may have easy evidence of this by noticing in a room lighted with gas-burners how close and impure the

air is close to the ceiling; but as the air inside a house is generally of a different temperature from the air outside, **movements and currents of air are constantly taking place,** removing foul air and bringing in fresh, provided that there be sufficient openings for the purpose through ventilators, windows, doors, cracks, and key-holes.

Gases are bodies having an exactly opposite character to solids; the latter have more cohesion than gases, which have a tendency to disperse and spread out; and therefore, even without differences of temperature, the air of our rooms has a tendency to be diffused and to become mixed with the outer and purer atmosphere.

Were it not for this constant **renewal of air** we could not exist in ordinary dwelling-rooms; but, owing to the influx of fresh air and the constant removal of impure air, health can be maintained in an enclosed space of moderate size.

By a beautiful provision of nature, **the plant requires what the animal rejects;** and the carbonic acid, discarded by man as hurtful, becomes food for the plant. Now, this acid consists of carbon and oxygen. The plant disengages and absorbs the carbon of this gas, returns to the air the pure oxygen, which restores to the atmosphere its life-giving qualities that had been taken from it by breathing, by furnaces, and by other processes.

This separation of carbon and oxygen is, however, done only by green plants and in sunlight—not in the dark, when they also evolve carbonic acid; it is, therefore, unwise to keep flowers in a bedroom. Gardens and plantations should therefore be cultivated wherever practicable,

not merely as pleasurable to the senses and delightful to look on, but as distinct health-giving agencies; and gardening should be carried on not less for the pure and innocent pleasure it affords, or the invigorating exercise it yields, than for its being an agreeable means of promoting healthful surroundings.

CHAPTER II.

FOOD.

THE great characteristic of life is ceaseless movement and frequent change, growth, and decay; waste and renewal oscillate in succession like the strokes of a pendulum. But our bodies less resemble a clock—which when wound up goes on for a time without further attention—than a steam-engine, which requires at short intervals supplies of fuel for conversion into force.

Thus it is with the human body, which has certain constant urgent needs—the first of which is air, and the second food. Without several regular renewals of fresh air the machine becomes clogged, as we have already seen, and stops for ever. But further, like the steam-engine, a constant supply of fuel is required, which is to be burned in the body and converted into flesh, warmth, and force; but in this case we call the fuel by the name of *food*, and, instead of its being wood or coal, it consists of bread, milk, meat, vegetables, &c. The engine ceases to work if water in the boiler cools; the furnace goes out if not supplied with fuel; and it is much the same with the human body.

Food may be defined as any substance which can be taken into the body to promote its life, health, growth, or action. It is indeed a substance which, when modified, enters the blood to renew some structure or to sustain some vital process. A continual course of wear and waste is going on, as we have said, and the refuse matter has to be removed from the system by lungs, skin, and kidneys.

To make up for this waste, an adult needs daily to replenish his system by taking $2\frac{1}{4}$ lbs. of dry food (he never really gets it dry, for it is always in combination with a proportion of water) and about 3 pints of drink, or say about a ton of material in a year. Taken into the body, this sustains, nourishes, and renews it. Fresh material is provided to take the place of the waste matters removed from the body, force and nervous energy are imparted, and the animal heat, which is produced by the oxidation of the bodily tissues, is properly maintained.

The importance of this last fact is recognised when we consider that a great lowering of the bodily temperature is necessarily followed by death, as in the cases of shipwrecked persons immersed in cold water for a long time, or of persons lost in the snow—nay, even in hot countries when a supply of food cannot be got, the body perishes through lack of animal heat—is, in fact, starved to death by it. Death by starvation really occurs through loss of animal heat, and for the rescue of a starving person heat is the first thing required.

Three kinds of foods are needed by us—**nitrogenous, non-nitrogenous,** and **mineral food.** Of the first kind the chemical constituents are:—Carbon, hydrogen, nitrogen, and oxygen; and we find examples of it in lean

meat, oatmeal, white of egg, cheese, and gluten. This class of food is mainly that known as flesh-formers, its office being, as indicated by the name, to form anew the destroyed tissues of the body.

The work of the second great class of food is chiefly to produce and sustain the animal heat required, which varies from 70° Fahr. in the snail to 109° in the pigeon, but which in man is uniformly maintained at 98·4° Fahr. As before stated, the human mechanism can no more work without this heat being kept up than a steam-engine can work without heat in the boiler.

This second class of diet is known as carbonaceous, or, better, as non-nitrogenous, and forms the heat-producing food. Its chemical composition is carbon, hydrogen, and oxygen. In this class are included sugar, starch, fat, butter, dripping, &c. Starch is insoluble in water, but saliva has the power of converting the starch and gum of our foods into sugar, in which state they are soluble and can mix with the food. Fat also assists in the nourishment of the body, and produces heat, force, and motion.

The third class is that of the mineral foods, as salt, lime, iron, potash, phosphorus, magnesia. With the exception of salt, these are not taken in their simple form, but only in combination with other substances; thus potash and lime are found in vegetables, phosphorus in meat and bones, iron and magnesia in water. The iron goes to the blood corpuscles, the phosphorus and lime go to form bone. Phosphorus assists the functions of the brain; salt aids secretion and promotes digestion, while other salts nourish the blood.

In addition to the above, we must add that there is a certain quantity of water necessary for the solution and digestion of the various foods, as, for instance, in a beef-steak, of which 75 per cent. is water, or cabbage, which has 85 to 90 per cent., or the most succulent fruits, such as strawberries which have usually even 90 per cent. Such a diet as biscuits contains least water, while water-melons hold most.

Thus the quantity of water imbibed daily is about $2\frac{1}{2}$ pints, while about 2 pints more contained in our daily food is taken into the body, making in all not less than about $4\frac{1}{2}$ pints of water each day to properly nourish us.

Our diet must be mixed. A man requires daily a small amount (from 2 to $6\frac{1}{2}$ oz.) of dry nitrogenous food, according to work done, to repair the body's waste and to renew its constant loss, but a more considerable portion (from 13 to 26 oz.) is needed for maintaining the bodily heat.

Even in the hottest countries a certain amount of oily or starchy food is found necessary to sustain the **animal heat.** This food is, so to speak, slowly burned in the body, and therefore supplies the required heat. In very cold regions the need of this kind of food is immensely greater. Thus the Esquimo, who knows nothing of the theory of the matter, instinctively feels a relish for oil and blubber, and in his own country would readily eat tallow candles if he could get them. Nay, it is even said that when the Russian soldiers entered Paris, in 1814, they left the city in darkness by drinking the oil in the street-lamps.

The greater necessity for heat-producing diet in Arctic expeditions is well known, and explorers in those dreary wastes are taught to avoid alcoholic drinks, and to take

abundance of oily food as a means of fighting better against the biting cold.

The necessity for a **mixed diet** is apparent when we learn that if we fed upon one diet alone, as meat, we should have to eat an immense quantity to obtain sufficient carbonaceous food, and that in so doing we should take far too much nitrogenous material into our bodies; or if we fed exclusively on bread, a quartern loaf and a half would hardly yield enough nitrogen, and we should thereby acquire such an excessive supply of carbon as would lead to disease. The disparity is, however, not so great as it seems by these statements, inasmuch as nitrogenous food contains a large proportion of carbon.

A diet composed wholly of meat would not only be very expensive, but would lead to disease of the stomach. Fortunately, the appetite palls with one kind of diet, and thus we have a natural taste for change, which leads us unconsciously to select what may be termed certain complementary foods, one supplying what the other lacks. Thus, animal food deficient in fat is commonly eaten with some substance that supplies the deficiency, as bread and butter, or potatoes and meat. Veal, liver, and chicken are eaten with ham or bacon, butter or oil with fish, whereas, milk and eggs go with such starchy food as sago or tapioca puddings; cheese does well with bread, and oil with salad.

When food is taken into the mouth it is cut up by the teeth, and moistened by the saliva. As before stated, this saliva, generated by the salivary glands in the mouth, has the important function of converting the starch of our food into sugar. Starch is insoluble and sugar is soluble in water, and such conversion enables this element of our

food to be dissolved. The moistened mass in the form of a ball is then borne to the back of the palate, and passes over a valve at the top of the windpipe known as the epiglottis, which at the passage of food closes over the windpipe to keep the food from getting into this tube; if a fragment of food does get into it—"going the wrong way," as we call it—we know the discomfort and violent coughing that follow.

The food passing into the gullet is laid hold of by a succession of gristly elastic horizontal rings of which the gullet is composed, and forced down towards the stomach. The difficulty of taking a pill without water is well known, as the rings have then nothing to grasp; and if food went down by mere gravity, the acrobat's feat of drinking a glass of water while standing on his head would be impossible. The stomach is a large pouch, capable of holding about five pints of liquid. Its walls are supplied with muscles which, when it is nearly filled with food, contract and relax, causing the organ to move about with a wave-like motion, and churning the food round and round so as to mix it with the digestive fluid. Inside its walls there are millions of very small tubes which pour upon the food the acid digestive fluid called the gastric juice, which has the property of dissolving the food, fat excepted.

For the purpose of digestion three and a half pints of saliva are daily generated in the mouth, while in the stomach no less than fourteen pints of gastric juice are formed each day for the same purpose. After the food has been churned about in the stomach and reduced to a greyish soup-like mass, called chyme, the next

process sees it passing out into the intestines, where it is acted on by the bile, which more or less dissolves the fatty part of the food. Here, all along the passage of the food through the small intestines, certain ducts draw off the nutrient part of the food; and when collected in the thoracic duct as chyle—a milky fluid—it is poured into the blood, and enters the circulation to nourish and repair the bodily system.

What is not fit for this purpose is passed out of the body as refuse. The alimentary tube, extending from the mouth to the extremity of the bowels, is in all about 30 feet long—being yet longer in herbivorous animals, as the sheep or the horse, and much shorter in beasts which eat flesh only, hence the intestines of a lion are only three times its length, while a horse has intestines twenty times its own length.

The stomach requires rest after exercising its functions, and will not work properly unless a proper interval takes place between meals. But this interval should not be much more than of four hours' duration, seeing that the time of digestion varies generally from two to five hours; and, as far as possible, the meals should be equalised in quantity and character. A very heavy meal at the fashionable evening hour of eight (when the time of physical exertion is past) is bad—especially so for young people.

Rapid eating is also a very bad habit—the food is thereby imperfectly chewed and rendered less easy to digest. Less saliva is mixed with it, the large insufficiently divided pieces of the food resist the action of the gastric juice, and fluids hurriedly taken weaken this juice; in

addition to which, the system is overworked and the appetite spoiled. The table here following gives the time required for the digestion of most common articles of food:—

TABLE SHOWING, IN HOURS, THE TIME TAKEN TO DIGEST CERTAIN FOODS.

Animal.	Time.	Vegetable.	Time.
	H. M.		H. M.
Tripe, boiled	1 0	Rice, boiled	1 0
Eggs, raw	1 30	Sago, boiled	1 45
Venison steak, boiled	1 30	Tapioca, boiled	2 0
Salmon trout, boiled	1 30	Cabbage (pickled), raw	2 0
Cod-fish (cured), boiled	2 0	Beans, boiled	2 30
Turkey, boiled	2 25	Potatoes, roasted	2 30
Goose, roasted	2 30	Potatoes, baked	2 33
Sucking pig, roasted	2 30	Apple dumpling, boiled	3 0
Lamb, boiled	2 30	Wheaten bread, baked	3 30
Beef, boiled	2 45	Potatoes, boiled	3 30
Beef, roasted	3 0	Cabbage, boiled	4 0
Mutton, boiled	3 0		
Mutton, roasted	3 15		
Oysters, stewed	3 30		
Eggs, hard boiled or fried	3 30		
Fowls, boiled or roasted	4 0		
Ducks, roasted	4 0		
Beef, fried	4 0		
Pork, roasted	5 15		

It may be a matter of curiosity to know how the time of digestion for so many articles of food can be so accurately known; and the source of such knowledge will therefore be stated. In 1832, a Canadian named Alexis St. Martin met with a gunshot accident, which left a large hole in his stomach. The man recovered, but the opening was never closed up. He dwelt with a physician as servant for some years; and, as through the opening the process of digestion could be closely watched, his master was able to enrich physiological science by a

series of observations on the time for digestion taken by various foods.

Condiments, as salt, pepper, &c., aid digestion by stimulating the flow of gastric juice and provoking appetite; but unless used in moderation, they may irritate the coats of the stomach. Hot meals again are beneficial, as warm food dissolves in the stomach sooner and more easily than cold food—a fact that can be illustrated by a simple experiment with a shred of meat and some dilute hydrochloric acid, an acid similar in its chemical character to the gastric juice.

Before leaving this subject, it should be added that appetite is promoted by physical exertion, fresh air, pleasant conversation, and a cheerful disposition.

The amount of food required varies, of course, with age, sex, health, and occupation. The growing body of youth requires a larger amount in proportion to its size than the adult. In old age less food seems wanted, partly because the body is then not capable of so much exertion. Women consume about one-tenth less than men. Appetite is naturally affected by health, and occupation is an important factor in this matter—those persons who labour in the open air eating usually very heartily.

We have spoken of dry foods in estimating the amount of nutrient matter required; but it must be remembered that most food is more or less of a wet character, and that some is chiefly composed of water. Thus, in such vegetables as potatoes, turnips, carrots, onions, salad, or in such fruits as apples, oranges, gooseberries, currants, lemons and pumpkins, the quantity of water contained in a pound would weigh from 12 to 14 oz., while not more,

than 2 oz. would be heat-producers, and 1 oz. flesh-formers. A still smaller quantity, say ½ oz., would be composed of salts and minerals.

The **dietary of nations** varies much according to climate, national character, and inherited tastes; but, generally, we may say that the dwellers in hot regions eat less than those in cold countries, as is natural, seeing that the system can with less effort sustain animal heat. A large part of the human race is sustained by vegetable productions alone, as rice, millet, the yam, plantain, and banana.

The dweller in Arctic regions consumes a great quantity of fish, because the harvest of the sea is his great resource; but most races eat with relish a certain proportion of animal food, and the analogy of stomach and teeth suggests this as a suitable food on account of its being so rich in nitrogen. But only a small proportion of our meals should consist of meat. Excess of all food has a tendency to produce corpulence, especially when combined with want of exercise, for the superfluous fat, not being oxidised, becomes stored in the tissues, and the body becomes gross or inert.

Milk, of which people do not take enough, is really **the one perfect diet**, though many adults cannot assimilate it easily in its natural form.

A very instructive table, drawn up by Mr. Coghlan, the Government Statist of New South Wales, shows the consumption of food by the people of New South Wales as compared with the three leading nations of Europe and with the United States. The excessive quantity of meat eaten per head, and the large relative consumption of tea, are very striking:—

CONSUMPTION OF FOODS.

Articles of Consumption.	New South Wales.	Great Britain.	France.	Germany.	United States.
	lbs.	lbs.	lbs.	lbs.	lbs.
Grain	304	330	455	166	305
Meat	278	105	74	69	120
Sugar	95	72	21	21	23
Salt	36	40	30	25	39
Butter	16	26	7	12	18
Potatoes	221	315	550	1,060	150
	ozs.	ozs.	ozs.	ozs.	ozs.
Tea	121	73	1	1	21
Coffee	11	15	52	83	115

Nearly all fruits can be eaten in their natural state, but most other articles of diet undergo the process of cooking to fit them for digestion. The effect of **cooking** is to render food agreeable to the taste and easy of assimilation, and to make a greater variety in our dietary, as the same article can be cooked in several ways. The process of cooking further destroys parasites and checks putrefaction, while the necessary preparation clears away unwholesome particles.

The chief processes are roasting, which, though the least economical, is the most appetising form of cooked meat; boiling, which is the easiest, but unless carefully done the most innutritious, unless the water into which the juices of the meat have been boiled be utilised for soup. Soup, as an article of diet, is not sufficiently employed in England and Australasia, though very common on the continent of Europe; but it is a most nourishing and economical food, a common fault being that it is made too rich.

Baked meat is less tasty, but loses less in weight than if roasted.

Stewing, a process intermediate between baking and boiling, is a nourishing and economical form of cooking meat, preserving its juices, flavour, and other qualities.

In applying heat to meat for the purpose of cooking it, either by boiling, baking, roasting, or stewing, it may be laid down as a principle that slow cooking at a low temperature extracts the juices, while the application of great heat, as that of boiling water, for two or three hours, destroys its flavour, its digestibility, and its nourishing qualities.

Two rules may be based on this:—1. When it is desired to extract the essence of the meat, as in making soup or beef-tea, the heat should be kept just below boiling-point, and should be long continued. 2. When the meat itself is to be eaten, strong heat should be applied for the first seven or eight minutes to harden the exterior, after which the temperature should be diminished, and the cooking of the joint completed at about the same heat as that recommended for soups. All foods containing starch require rapid boiling to break the cell envelopes.

It is not necessary to go fully into this subject, but it may be pointed out that pastry is less digestible than good bread, as the starch granules in it become coated over with fat, rendering it less easy of absorption; but some highly nourishing cheap puddings can be made of rice, semolina, tapioca, and specially of the macaroni, so common in Italy —all of which are pleasant to the taste and easy to assimilate, while the last-named deserves more attention than it has yet received.

CHAPTER III.

DRINK.

WATER enters largely into the composition of the human body, forming nearly three-fourths of it. True, the water is in union with other bodies; but we realise its quantity when considering that if dried up, as in the case of an Egyptian mummy, the body would weigh only a few pounds. The ordinary estimate is that the muscles contain 75 per cent. of water, the blood 79, and the brain 80 per cent.; and a man whose weight is 11 stone, or 154 lbs., has of that total 111 lbs. of water in his composition.

The quantity of **moisture in the body** cannot be greatly varied without inconvenience or suffering. But the body is constantly losing moisture—from the skin alone in perspiration two pints are exuded daily, and very hot weather or great exertion increases this quantity. Thus, in a waterless desert, as in the Australian interior, cases have occurred where persons unable to find water have experienced successively thirst, weakness, fever, and delirium, until death has put an end to their sufferings. Wounded soldiers on the battlefield, also, after losing much blood, always became intensely thirsty. Thirst is assuaged by drinking, and to a small extent, by a bath, during which some water works its way into the body through the pores of the skin.

Thirst is indeed the look-out sentinel which tells us when the body needs a greater proportion of fluid in its

composition, and the readiest way of obeying its warning is by drinking a sufficient quantity; but what this fluid shall be varies very much with persons and circumstances.

All animals, and the great majority of the human race, find in water a proper and sufficient satisfaction for bodily thirst, though with its aid many other pleasant and wholesome beverages are made. Then there is the one perfect food and drink—milk—suited to all ages, but imperatively necessary for all young animals; of this substance seven-eighths are pure water. Lemonade, aerated waters, and the like, are simply water flavoured with vegetable or mineral ingredients, and made exhilarating with gas. The basis and principal part of all beverages is really nothing but water; but, by the addition of certain ingredients, or by various modes of treatment, the basis may be so altered as to make beverages of widely different character and flavour.

The natural taste for variety, and even for something more stimulating than simple water, has led to the invention of many diverse drinks most of which may be described as stimulants of two kinds—intoxicants or non-intoxicants. Thus, we have belonging to the latter class, chiefly introduced in the seventeenth century, tea, coffee, and cocoa; while in the former class are spirits, beer, wine, &c. These form a class of such importance, and have a tendency to produce such terrible evils, that separate chapters will be given to an account of them and of the trouble resulting from their misuse.

Down to the sixteenth century our so-called temperance drinks, as tea and coffee, were unknown, and beer

and wine in various forms—spiced and unspiced, hot and cold—were used at every meal.

In Elizabeth's reign thirty-two different kinds of foreign wine were imported, the strongest being in most request. The lusciousness of the draught was often heightened by the addition of sugar, lemons, eggs, or spices. Home-made wines were also used, and the many kinds of the then common drink—beer—are somewhat surprising, pointing to a very extended and varied use of it, as the following names of its varieties will indicate:—Double and double-double beer, bracket, dagger ale, huffcap, mad-dog, angel's food, dragon's milk.

After the Revolution, beer-drinking was on the wane, a raging and disastrous taste for gin having set in. In 1736 the import duties upon this spirit were raised; and a better check was afforded, in 1743, by legislative improvements effected in the licensing laws.

Water and milk are the **natural drinks** of men and animals; but, as a separate chapter is given to water further on, the reader will there find discussed its qualities as a beverage.

The most important beverage that we have to deal with is **tea**, which, next to water, is the most common drink in the world, as half of the whole human race drink it. Tea is got from the young leaves of the tea-plant—a kind of camellia with white double blossoms, growing freely in China, India, and Ceylon. The spring crop has the best flavour, and forms green tea; the summer leaves have a dull green colour, and become black tea. An alkaloid substance in it called theine is the nourishing part of tea,

and a volatile oil gives its flavour. If boiled, the delicate volatile oil would fly off, and the tea would be spoilt. Of course, tea has little nutritive properties; but it increases respiratory action and arouses the nervous system. The injurious element in it is tannic acid—the same substance that tans leather—which tends to harden albumen, and to injure the walls of the stomach. The best way to make tea is to put the tea-leaves into a little bag or strainer, and when the tea is fairly drawn to remove the tea-leaves altogether by means of this strainer, as stewing them brings out this tannic acid and injures digestion.

Coffee is prepared from the ground and roasted berries of an evergreen shrub growing in hot climates, and is a native of Arabia and Abyssinia. The plant has white fragrant blossoms, and its leaves are glossy on the upper surface. It grows to a height of from 15 to 20 feet. The principal supplies are drawn from Arabia, Abyssinia, Ceylon, the East Indies, and Tropical America. Like tea, it acts upon the nervous system and quickens the heart's action. It also has a volatile oil with a rich and pleasant aroma. Coffee becomes a soothing, cheering drink, though, in the same degree as tea, it may be regarded as an adjunct to nutrition, rather than as a food itself. It checks perspiration, and is an antidote in cases of poisoning by opium or alcohol. Its distinctive principle is called caffeine. Coffee is often adulterated with chicory, a substance which has no hygienic value. This beverage is very largely drunk on the continent of Europe where, save in Russia, little tea is consumed.

A far more nourishing drink than either tea or coffee is

found in **cocoa**—a product rich in gluten, starch, and fat. It is made from the seeds (cocoa nibs) of a plant growing in Tropical America and in Ceylon. When manufactured for use, it is usual to substitute sugar for some of its fat, so as to prevent it from disagreeing with dyspeptic people. It is prepared, like tea and coffee, by making an infusion of it with boiling water.

A pound of cocoa shows on analysis the following substances :—

	oz.	gr.		oz.	gr.
Water	0	350	Starch	1	53
Albumen or Gluten ...	3	35	Woody Fibre	0	280
Theobromine	1	140	Colouring Matter	0	140
Cocoa Butter	8	0	Mineral Matter	0	280
Gum	0	426			

Chocolate is cocoa ground up with sugar and vanilla, or other flavouring matter. It makes a rich nourishing beverage, but it is also often eaten as a sweetmeat.

Milk is a most nourishing beverage, and it is the sole food of very young mammals, its composition indicating it as the one perfect food which furnishes for the body in due proportion all the nutrients required. The composition of cows' milk is as follows :—

	Percentage.	
Water	86·3	
Caseine	4·1	—Nitrogenous (flesh-forming).
Milk fat (lactose) ...	8·8	—Carbonaceous (heat-producing).

Milk owes its opacity to the fat globules in it. These rise in the milk as cream, while from cream we get butter by churning. When skimmed off, the cream deprives the milk of most of its fat and a small proportion of its caseine. It is the caseine which, by the action of a weak acid,

readily coagulates in the familiar form of *curds*, leaving a watery liquid called *whey*. The curd when pressed becomes cheese, a substance very rich in nitrogen, possessing, in fact, nearly four times the amount of the flesh-forming element to be found in meat. Buttermilk, the milk which remains after churning, is also a useful article of diet, containing some of the nourishing parts of the milk, and is well suited for persons of weak digestion.

Two cautions must be given—milk is liable to absorb dangerous gases or fever-germs. Germs grow quickly in all organic matter, and most quickly in liquids. Milk, therefore, should not be left near a sink or drain, or in a bedroom, or in a sick person's room. Secondly, when we are heated, there is danger in taking iced drinks—for inflammation of the bowels and death have often been caused by it.

There are other beverages—as lemonade, soda-water, ginger-beer, and some mineral waters—but the former have no hygienic value, and the others, possessing medicinal virtue, belong to the domain of medicine rather than of hygiene. Real lemonade, indeed, is a beneficial and most refreshing drink, especially for invalids suffering from fever, but the aerated water sold under the name of lemonade is quite another matter—aerated water flavoured with essence of lemon, and is therefore of no great value.

The greatest service would be done to the cause of **temperance in drink** by the introduction of some truly wholesome, appetising, non-alcoholic drinks; but they do not yet seem to have been invented. Dr. Parkes, however, gives a list of certain beverages that he strongly advocates as friends to health:—

1. The water in which rice has been boiled, flavoured afterwards with sugar; tartaric or citric acid, if added, further improves it. This has been much used by the troops in India.
2. Skimmed milk.
3. Oatmeal and water, with a little sugar. The oatmeal, ¼ lb., to be boiled in two to six quarts of water according to taste, flavoured then with sugar, and drunk cold or hot, the oatmeal not being strained out but stirred up before drinking. This is said to be a most nourishing beverage, giving both refreshment and bodily strength.
4. Cold tea is refreshing also, but less nutritious.
5. Thin cocoa too is nourishing and refreshing.

CHAPTER IV.

DWELLINGS.

The earliest men—and of these we possess no written records—had no houses. They sought shelter in caves and hollows of the rocks from the pelting rain, the snow-storm, and the wintry blast. These, too, would be a hiding-place from their enemies, and a temporary store-house for weapons or food. The dwelling-places of the Australian blacks are little better, as they are a mere interlacing of boughs and bark to form a breakwind. In hot climates little shelter is required. Nevertheless, man's wants are very imperfectly provided for without a considerable degree of shelter, warmth, and protection; and, as

civilisation progressed, man advanced successively from the cave or the tent to the hut, and, by a long series of steps, to the dwelling of modern times—comfortable, weather-tight, often elegant, and still oftener insanitary.

In speaking of the sanitary requirements of a house, we have to begin with **the site.** Now if this be low it will be swampy and dangerous to health. It is an absolute requirement that the site should be dry; pulmonary consumption in England has, on good authority, been stated to prevail much more in damp than in dry districts.

Next a sandy or porous soil is desirable; a clay soil is to be avoided on account of its holding water, and an alluvial one because it is mostly wet and may be malarious. Made ground is most objectionable, for this consists of house-sweepings, vegetable refuse, and all sorts of filth, which may contain organic matter in dangerous proportions; for the soil holds air and other gases, and exhalations of putrescent matter will be drawn up into the house. Then, too, the foundations must be so laid that moisture is not sucked up by them into the walls. With a wooden house the walls should rest at least on blocks; with brick or stone structures, slate or damp-proof courses should shut off all dampness; and in every case there should be a ventilated open space between floor and foundations, so as to secure there dryness and purity of air.

The higher the site the better in general, as thereby it can be more effectively drained. The **drains** must be such as can be seen and easily got at for examination or cleansing, and they must not be *under* the house.

Care should be taken that no inside drain may lead into main drains with a close or untrapped connection that would admit of foul air from the outside drain being sucked up into the house. Generally speaking, it is enough if an inside drain be disconnected at the point where it leads to the outer drain, and this point may be in an open space. Be it well remembered that imperfect drainage is the parent of fever, cholera, and many other diseases; and that good drains bar one principal means of entrance against these dread visitants.

One hint more may be given:—Whenever a bad smell arises, do not merely stifle it with chlorine or carbolic acid, but remove the cause of it.

In Chapter I. the absolute need of **ventilation** was dwelt upon. Ventilation pertains only to a dwelling or other building. It is not necessary to dwell again upon the evils which follow from bad ventilation:—Sickness, disease, impaired energy, death are the consequences. Indeed the case of many people would be intolerable were it not that with or without their will a great deal of ventilation takes place. Through the crevices of doors, windows, flooring, even through walls of brick and wood, and down chimneys tiny streams of air stealthily creep, sucked in by the warmer inside air. Fireplaces, especially when furnished with fires, are always good ventilators, causing a strong upward current of air. But no houses should be built—nay, many of us think none should be licensed for occupation—until they are provided with special means of ventilation by grated openings in the walls and roof to let out the heated and impure air; further, inlet tubes or other appliances should be

provided which would admit fresh air close to the ceiling, thus giving ventilation without draught. Windows also, especially in schools, should open at the top, and reach almost to the height of the room, where the expired or bad air usually collects. The aim of ventilation is to renew air without causing draught, and it is effective in proportion as this object is achieved.

In speaking of **windows**, one must not omit to say that they should be sufficiently large to let in enough of light and sunshine. Neither plant nor animal can be healthy without light, and sunshine has special powers of purifying the air; while the Italian proverb says, where the sunshine cannot come the doctor does. In our homes, after daylight, we have for some hours artificial light by some illuminant, such as gas, oil, kerosene, or candles, all of which, as we have already seen, vitiate the air, and render it unfit for respiration.

Rooms are warmed by fires and heated stoves—the former having a cheerful aspect, but being a wasteful contrivance, seeing that half the heat escapes up the chimney; while stoves require a special supply of fresh air, as otherwise they dry the air to an unwholesome and most unpleasant extent.

The **flooring boards** of a room should fit close, so as to exclude malarious exhalations from below. This, however, cannot be ensured unless there be sufficient ventilation beneath the floor. Some persons stain the boards and use movable mats or rugs; others use linoleum, which is clean and durable. Where carpets are used they should be lightly laid down, so as to be easily removable to allow of the dust being beaten out.

The **walls,** if rough, will hold much dust, and, therefore, it is desirable that they should be made smooth. **Dust** must be fought against as a passive and sometimes an active enemy; it is at least always an ally of the great foes to health, for disease germs may find in it a shelter, a nest, a resting-place, a means for onslaughts upon mankind; and dusting our rooms and furniture should therefore be looked upon as a sanitary obligation. Dusting should be effected so as not merely to scatter the particles of dust into the air; a damp mop or a roller brush will generally do what is needed in a better way than mere wiping with a duster or brushing with a broom. Furniture is often so made or arranged that dust settles about it, which, from not being easily accessible, is often neglected.

Dust gathers on the tops of books, on the summits of wardrobes and such high pieces of furniture, also under chests of drawers and under beds; but from all these recesses it must be carefully and frequently hunted out.

Before leaving this subject of the inside walls, a few words may be said about them. In a wooden cottage, lining boards of pine stained and varnished, or simply varnished, look very well, hold little dust, and can be easily washed. Lath and plaster walls can be papered with sanitary paper, of which there are now many pleasing patterns. If this be done, the walls can, without injury, be wiped with a damp cloth, and if the paper is varnished the walls may be washed, and the paper then becomes a permanent improvement.

A more expensive way is to have the walls painted with four coats of oil paint and then varnished.

Perfect smoothness is obtained, and thorough cleanliness can then be secured by washing. If a wall be papered with a non-sanitary paper, care should be taken that it is not an insanitary one. Thus certain greens and mauves prepared with arsenic have proved injurious to the inmates of a household; and flock papers, however handsome, should be invariably discarded, as they catch and retain dust. When a room is re-papered, it is necessary that the old paper, which is dirty and may be quite foul, should be stripped off before laying on the new one.

A few special words must be said about **bedrooms**. In these rooms we spend about a third of our lives, and perhaps most people spend more time in their sleeping chamber than in any other room. A bedroom should be of ample size, and with no more furniture in it than is necessary, for every box, chest of drawers, and so on, diminishes the actual breathing space. The fewer hangings there are the better; and soiled clothes must on no account remain in the room. Grated openings, high up, should lead direct to the outer air; a chimney is most desirable; and the windows should be opened during daytime, and not wholly closed at night, an inch or more of open space being left at the top. If the bed cannot be so placed as to prevent draught from an open window, then the door at least should be left open.

With windows a simple contrivance can secure ventilation without draught. The bottom sash being raised about three inches, a closely fitting block of wood is inserted, filling the whole length of the open space. The lower sash then fits down closely on this, and its top is there-

fore raised above the bottom of the upper sash. Air can enter about the middle, between the space so caused, and its direction will be towards the ceiling. Fresh air is therefore obtained without any draught.

Some persons entertain a strange dread of admitting the night air into their bedrooms, but the prejudice is quite unfounded. If they do not breathe the *night* air, what air are they to breathe? As a matter of fact the night air is rather purer than that of the daytime.

The **disposal of house refuse** is another important sanitary consideration. Dust is put into the dust-bin, which, by preference, should be a movable iron box—not a fixed structure; and it goes without saying that it must not be kept too near the house. In towns this is usually removed by the dustman; in the country it can be added to the manure heap or dug into the soil. Slops have to be poured down the main drains, which should be afterwards flushed. Potato peelings, cabbage stalks, and other vegetable refuse may be burned when dry, as also litter of paper and rags. As little as possible should be left in a heap to rot; and it is surprising to find how much of house refuse can be subjected to the great purifier—fire.

Of **closets** much might be said. If built in a house, they should be on an outer wall, should ventilate into the open air, and a long ventilating pipe should come up from under the seat high up into the open air and above the roof, while the water that flushes the pan should be disconnected from the supply used for other purposes.

The earth-closet is, however, properly becoming much used; and, rightly set up, it is the best of all. A box of

earth with a scoop and a movable pan under the seat are all that are needed, and if dry clayey or loamy earth be freely used the contents of the pan will be effectively disinfected and even chemically changed, though deodorants also should be used. When so treated, the contents can be removed without offence in towns; while in the country if dug into the soil they become a highly fertilising manure. It need hardly be said that closets, dust-bins, and manure heaps should all be removed far from the house.

A **garden** where practicable is not merely a pleasurable adjunct to a house—it is a direct source of healthfulness. As before said, trees and shrubs give shade and shelter, draw up moisture from the ground, and breathe out the life-giving oxygen, while a garden tempts to wholesome out-door exertion and yields some of the simplest and most innocent pleasures that man can enjoy.

Having told **what a sanitary house should be,** we may now draw a picture of what it should *not* be. First, then, dirt is encouraged in the following ways:— The house is built on low swampy ground, placed upon unhealthy rubbish heaps, soaked with stagnant water, foul emanations from which arise and are sucked into the house. There is no damp-proof course, and the moisture rises in the walls, making them wet. The closet is too near the house; it is not ventilated, and no deodorant is used; there is a manure heap not far off, and no dust-bin. So filth and refuse accumulate in the back yard. Then the house drain is badly laid, and has leaky joints, so that the ground and air are polluted; besides all this, the outlet pipe from the house is not disconnected with

the outer drain, and so dangerous sewer-gas from it enters the house; and finally, as there is no filter, unwholesome water is drunk from a well into which sewage has leaked.

Secondly, ventilation is prevented. The windows are closed, the sashes being fixed; and the walls are devoid of ventilating openings. Register grates are provided, but they are kept closed instead of open, and so the chimney fails to serve as a ventilator. The gas stove affords convenience for cooking, but there is no provision for carrying off its noxious fumes; and beneath the basement there are no gratings—hence the space under the floor is not ventilated, and the timbers decay through dry rot.

This may seem a very bad case, but unfortunately in daily life we meet one or more of these faults in most houses, so little heed do people pay to the simplest sanitary rules; and it is only by dint of constant reminding that they at last seem to learn matters so closely concerning their welfare and safety.

CHAPTER V.

CLOTHING.

NATURE has provided a suitable covering for the beasts of the field, the fowls of the air, and even the inhabitants of the water. Birds have light warm coats of feathers; beasts have thick skins, clad outwardly with fur, wool, or hair; fishes have scales to protect their flesh and to enable them

to glide easily through the water; but man, who is destined to range through all latitudes, and endure all extremes of climate, is purposely left to supply himself with the dress that his varying circumstances may require.

By nature man is naked; but civilisation has taught him the great advantage of wearing clothes, so that now only the most savage races go naked; while based on clothes is to be found the outward expression of many artificial distinctions, as poor or rich, lay or clerical, civil or military; but the object of clothing may be defined as **protection, decency, and ornament.**

Carlyle declares the last of these to have been the original purpose of savage man, though now it stands last in importance; the love of decoration, which led to painting or tattooing the body, found further vent in a tufted head-dress, in a cloak of skins, or in a skirt of cloth; but the chief purpose of dress now is **protection**—in cold countries, to sustain the animal heat at a pitch below which pain and even death must ensue; in warm countries, to screen the body against the fiercest rays of the summer sun; in other words, to preserve the body at an equable temperature, without which neither health nor even life can be maintained.

The heat of the body must be kept at nearly 98·4° Fahr., and the temperature of most countries is below this; but at special times, and in particular tropical districts, the warmth of the air is even greater, so that protection from the fierce heat is needed.

Then, again, few persons, save those with a very thick head of hair, as in the case of negroes, could stay bare-headed with impunity in blazing tropical sunshine. Were

the head not guarded by a hat, turban, or fez, sunstroke would be a common result; and if the foot were not protected by the ancient sandal or the modern boot, footsoreness and injury would follow. Of this, a good illustration is afforded by Stanley's recent African wanderings. We read that, while in the depth of the central forest lands, the hostile tribes of dwarfs caused his party much trouble, and even some deaths, through leaving poisoned skewers in the tracks, cunningly set up under withered leaves. When barefooted men of the expedition trod upon these skewers they suffered acutely, their sufferings sometimes ending in death.

Through the use of clothes man can be a denizen of all climes. The rhinoceros exists only in the earth's hottest regions, while the reindeer would perish in the tropics; but man withstands the severity alike of tropic heat and arctic cold, enduring every variety of climate mainly through the protection afforded by his clothes, whose office is to keep in the natural heat generated in the body. In intensely cold regions this is secured by several layers of garments composed of woollen and fur clothing. Under the fierce sun of the torrid zone, suitable clothing, light in colour and texture, guards the body from injury, and wards off the glaring sunbeams. Thus we see in both cases the same object attained—clothing keeping the body at an equable temperature.

The substances used as dress materials are **of either animal or vegetable origin**—the former being wool from the sheep, cashmere from the Tibet goat, alpaca from the animal of that name in South America, mohair from the Angora goat, and silk from the silkworm. To this we must

add leather for boots, shoes, and gloves; feathers for ornament; bone, horn, and ivory for buttons; and fur for extreme warmth, as in the case of jackets, linings, &c. The vegetable matters are chiefly cotton, which is the down around the seeds of the cotton plant; or linen, the fibres of flax; but india-rubber is used for waterproofing; gutta-percha for soles of shoes; straw is used for bonnets and hats; while even prepared paper is often used for collars and cuffs.

These are the principal substances—practically the only ones — now used, though modifications of them produce many varying materials. Thus kerseymere is a plain cloth woven from fine wool; linsey woolsey is a coarse cloth made of flax and wool; satin is silk so dressed as to have a smooth surface; velvet is a silk material with a pile of short threads; plush is similar, but is not always made of silk; taffety, moiré, and brocade are glossy and ornamental silk fabrics; crape is another silk material; cambric and lawn are fine linen substances; velveteen is like velvet but made of cotton; calico is cotton cloth; jean is a twilled cotton cloth; corduroy is a very strong, ribbed cotton cloth; fustian is a common twilled cotton cloth, which will easily take the impress of printing; and lastly we may add muslin, a fine cotton fabric.

A table of these materials is here supplied, giving details of these substances:—

CLOTHING MATERIALS.

Material.	Source.	Use.
Vegetable.		
Linen	From fibres of stem of flax	Collars, cuffs, table linen, &c.
Cotton ...	Lining of pod of gossypium	Underclothing, sheets, prints, muslin, fustian, corduroy, &c.
Hemp	Fibres of stem of cannabis	Harding — mixing with flax.
Jute	Fibres of nettle-like plant, East Indies	Mixing with hemp, silk, wool, &c.
India-rubber ...	Hardened juice of tree	Overshoes, elastic web, water-proofing.
Gutta-percha ...	Hardened juice of tree	Soles of shoes, &c.
Paper	Pulp of rags, both linen and cotton	Collars and similar articles.
Straw	Dried stem of corn plant	Bonnets and hats.
Rushes, grass, wood	... ...	Hats, chip-bonnets, &c.
Animal.		
Silk	Cocoon of silkworm	Fine fabric for dresses, ribbons, velvets, &c.
Wool	Fine hair from sheep and similar animals—llama, alpaca, &c.	Cloth, worsted, for dress fabrics, blankets, &c.
Hair	Covering of camel, goat, &c.	Camlets, coarse cloths, &c.
Leather ...	Skins of animals tanned	Boots, belts, gloves, &c.
Furs	Skins of animals with outer covering left on	Tippets, hats, linings, &c.
Feathers ...	Outer covering of birds	Trimming for hats, &c.
Horn, ivory, bone	Hard parts of animals	Buttons, &c. (Buttons and other dress fastenings are often made of metal.)

For the purpose of health and comfort we require certain qualities in our dress materials. Of these **warmth** stands first. Now, a moment's thought will show us that there is no real warmth in clothes; wrapped in a blanket we

become warm, but if we take the same blanket and fold it over a piece of ice we shall find the ice continue to be as cold as ever. Indeed we keep ice in chests wrapped up in flannel to prevent it from melting. The reason is very simple :—Woollen materials, such as flannel, form a barrier through which heat cannot easily pass, and so the outer heat cannot get through the blanket to melt the ice. Clothing, especially woollen clothing, keeps our bodily heat from escaping ; and, as fresh heat is constantly being generated, we soon become very warm, as the additional heat accumulates.

Heat is commonly lost by us in three ways—by conduction, as when the body is in contact with something colder than itself. In winter weather, we lay hold of a cold bar of iron or a slab of marble, and are conscious of touching a chilling surface, or, in other words, feel the heat of our hands being conducted away. Next we lose heat by radiation. Coming out of a warm room and standing in the open air, on a chilly day, the heat radiates from us in all directions into the colder air, which is touching us and drawing off our animal warmth. Then, further, we lose heat by evaporation, this process always carrying off heat. The perspiration at all times comes out of the pores of the skin, penetrates our clothing, and is borne away into the atmosphere in the form of vapour.

Now, clothing of suitable material and properly regulated will counteract these losses of heat, and keep the body at the temperature necessary for health and comfort. Woollen materials are best for this purpose, as they do not readily allow heat to pass through them, or, as we say, they are bad conductors of heat.

A story is told of a railway accident in America, in which a party of excursionists were scalded by the steam of the boiler. The men, being dressed in woollen clothing, were little injured; while the women suffered severely, several of them, who were clad in thin muslin dresses, losing their lives. In the matter of warmth, then, woollen materials claim the first rank, the rest following in this order—furs, down, silk, cotton, linen.

For outer garments only, **colour** is of some importance with regard to the absorption of external heat, as is shown by the following table of materials quoted by Dr. Treves,* which records the amount of heat absorbed in a given time by shirting of the same quality dyed as under :—

When white received	...	...	100°	Fahrenheit.
Pale straw	,,	...	...	102	,,
Dark yellow	,,	...	...	140	,,
Light green	,,	...	...	155	,,
Turkey red	,,	...	...	165	,,
Dark green	,,	...	...	168	,,
Light blue	,,	...	...	198	,,
Black	,,	..	...	208	,,

Dark blue absorbs almost as much as black, and different materials of the same colour vary little in their power of heat absorption. Hence we see the value of a white dress or head gear in the summer sun, and the wisdom of playing cricket in white flannel is, for two reasons, made apparent, one of which we shall learn further on. We now see also the suitability of the usual white puggaree for hats, and can appreciate the reason why the English troops serving in Asia or Africa are not condemned to wear either their scarlet or blue uniforms,

* "Treatise on Hygiene and Public Health :" N. Buck, London, 1879.

or the hussar's busby, the lancer's heavy helmet, and still less the heavier bearskin of the Foot Guards.

One caution as to colour must be given. Sores, headache, and discomfort have been occasioned by wearing clothes which have been coloured with poisonous dyes containing mostly arsenic. In this way the skin has often been irritated and inflamed by dyed stockings, handkerchiefs, and gloves. The colours complained of have usually been red, magenta, and green.

Another quality belonging to flannel under-garments is their **power of stimulating the action of the skin** by means of their rough surface, and, as the body can easily be kept warm enough in bed, the wearing of a cotton rather than a flannel night-dress is recommended in order to give the skin a rest.

Another requisite quality of substances for clothing is their **power of absorbing and evaporating the body's moisture.** Here, again, wool stands first in value; the perspiration must escape, and if, as in the case of linen, it does not quickly pass through, a cold may follow, and an important function of the skin will be affected. Similarly a mackintosh overcoat, useful as it is in a shower of rain, is unpleasant and even injurious if much worn; though for occasional protection against rain it is most serviceable, and, unlike a woollen overcoat, does not get inconveniently heavy when wetted.

It is found by direct experiment that the absorbent power of the following dress substances diminishes in the order here given, wool having the most absorbent power and cotton the least:—Wool, fur, down, silk, linen, cotton. Except in the relation of linen and cotton, this

order corresponds to the one before given in estimating the value of these substances for purposes of warmth.

Another element to be considered is the **porosity of clothing,** wool being again at the head of dress material, and leather lowest in the scale. By porosity in this case is meant the facility with which air can be driven through it. Air is a non-conductor of heat, and the retention of it in the interstices of the cloth adds to the warmth of the material. The most porous material is thus the warmest.

All dress worn by men or women **will burn,** but owing to the shape and character of their respective garments, the danger of injury through the burning of one's dress is almost wholly confined to women. Their loose skirts, especially when made of cotton (muslin being the most dangerous form of this substance), expose them to great risk; and at one time, when women's skirts were worn distended by a crinoline, fatal accidents by burning were terribly frequent.

Some cotton or linen garments (woollen ones are less dangerous) are made fire-proof by dipping them into a solution of tungstate of soda; but the operation would have to be repeated after washing. The effect of so preparing cotton or linen garments would be to render them incapable of blazing; they would only smoulder like wool.

Certain fabrics, again, influence the body by being bad or good **conductors of electricity.** Silk, as a bad conductor of electricity, is the best material for retaining it in the body, while wool, linen, and cotton retain it less. Of this branch of the subject little seems known; but it

is an undoubted fact that the bodily health and spirits are affected by the electrical conditions of the atmosphere. On a dry, bright day the bodily system feels brisker and fitter for work than on a dull, humid day, when electricity may be abstracted from the body by the damp surrounding air.

The **chief requirements of a head-dress** are that it shall be light and properly ventilated; great warmth is not required for the head, as the brain is fairly protected from cold by the skull, while the scalp is well supplied with blood-vessels and has a vigorous circulation, in addition to which the hair forms a natural covering. Hence the head requires clothing less than any other part of the body.

The head-dress of men has shown many varieties, from the eastern turban and fez to the western hat or cap. The helmet seems superseding other head-gear for soldiers and policemen, besides being occasionally used by civilians for summer wear, for which it has great recommendations, inasmuch as it is artistic in shape, shades the eyes, and shelters the back of the neck from the sun, and fairly keeps off the rain.

For summer wear the straw hat is cool, airy, and suitable; for winter wear or outdoor games, when the sun has little power, a felt or cloth cap is soft to the brow and comfortable; but every kind of head-gear should be ventilated, either under the band or at the crown, otherwise the head becomes too hot, and the exhalations arising from it cannot be carried off—hence we have oppression, headache, and perhaps neuralgia, besides loss of hair; while, further, a tight-fitting, rigid hat constricts the

blood-vessels and checks their proper supply of nourishing blood. A good dress hat has yet to be invented. The three-cornered hat of 150 years ago was not inartistic; but the Spanish sombrero, or the cavalier hat of Charles the First's time, better fulfils the purposes of a hat, and lends itself freely to artistic treatment.

The **outer clothing of men**, though extremely inartistic, is a fairly convenient, work-a-day dress, and its being mostly made of wool is much in its favour; but it could be greatly improved. The formal evening dress has the merit of coolness, but no other; it admits of no decoration, and does not suggest the main purpose of vesture as a **covering**, the chest and stomach being left with insufficiently warm clothing.

A tasteful and comfortable substitute might be a velvet Norfolk jacket, with full knickerbockers of the same material, long stockings, and shoes. Indeed, the Norfolk jacket—the ancient doublet lengthened—suggests itself as a great improvement on the usual modern coat. A writer in *Black and White* thus speaks of its merits:—"The jacket has every advantage and no disadvantage, if it be properly shaped. It affords warmth where nature needs it most. It gives freedom where the play of sinew and muscle is greatest. It admits of additional clothing in cold climates or seasons without alteration. Those who have worn it in the tropics and in temperatures below zero know that it is as cool, because it affords a circulation of air, in the one case, as it is warm because it protects the vital organs, in the other."

With this garment a waistcoat could be dispensed with in hot weather—nay, the ordinary waistcoat is very de-

fective, from its leaving too much of the chest exposed. The substitution of knickerbockers and stockings for trousers could be justified from the greater comfort thereby secured, besides obtaining a vesture more artistic to the eye and more in harmony with the structure of the leg. Gaiters could be used for outside wear or riding.

Boots and shoes should fit the feet, and be made in accordance with the shape of the sole of the foot, a thing rarely done. Narrow-toed or pointed boots should be carefully avoided, and high, narrow heels are very objectionable, as tending to injure the foot and spoil the gait. Boots are warmer than shoes, but for ordinary wear the latter are healthier and are better calculated to strengthen the ankles. Tight boots cause chilled feet and produce corns, and very thin foot coverings of whatever kind make the feet cold.

For reasons already given, **men's innermost underclothing** at least should be of wool. It should also be porous and loose-fitting—porous for the sake of ventilation, and it should be loose-fitting, for a stratum of air is then retained between the body and the garment—air being, as we have seen, a non-conductor; hence loose garments are warmer and healthier than tight ones. For the same reason, garments worn in layers, or over one another, are warmer than the same material in one garment. It is, however, to be noted that if too many articles of clothing overlap there may be too great a degree of clothing in one part, and men often, therefore, wear instead of singlet and drawers a combination garment uniting these two—an under-dress equally suitable for men and women.

Constrictions of all kinds are to be avoided—belts, garters, and tight collars. Braces should be used instead of belts, and suspenders in lieu of garters, while any tight fastening round the neck is apt to check the circulation and inflame the glands. Tight clothing around waist or chest affects the respiratory powers, and is, of course, most injurious.

The present system of dressing the neck seems about right, the lower part of it only being clad; with sailors it is bare, with soldiers closely covered up. It seems a matter of usage only, as sailors do not suffer specially from affections of the throat.

For **night attire** a cotton night-shirt seems the sufficient and suitable garment; and no night-cap should be worn; but for the aged or rheumatic, or even for very young children, woollen night-dresses may occasionally be suitable.

The **bed-clothes** should be light and sufficiently warm —a cotton counterpane or a down quilt may be used in winter, but we should bear in mind that too much warmth is weakening. Generally speaking, bed hangings are unnecessary, as they obstruct currents of air and catch dust.

The somewhat delicate task of criticising **feminine apparel** must now be attempted. To begin with the bonnet: its function is mostly ornamental, and it affords little protection from a cold wind and less from hot sunshine. Were it not that women have usually an abundance of hair, its inadequacy would be very evident, while from an artistic point of view it falls immeasurably behind a broad looped-up beaver or straw hat, garnished with a flowing feather.

Boots and shoes are generally worn too tight, too small about the toes, so as to cramp and deform them, and with heels so high and ill-placed as to throw the foot out of shape and to make the walk ungraceful, while by reason of the narrowness of the heel the wearer runs frequent risk of a sprain through the foot suddenly twisting. The sole is often too thin to afford sufficient protection from chills and damp, thus leading the way to colds and rheumatism.

Of the rest of the dress two prevailing faults may be indicated:—It is tight where it should be loose, and loose where it should be close-fitting, two defects which must seriously affect breathing or circulation, or which may let in injurious draughts of cold air; and, under all these circumstances, life and health are endangered; while, further, the clothing is most unequally distributed.

There is really no reason why, beneath the outer garment, women and girls should not be dressed nearly the same as men and boys; an even distribution of warmth could then be better secured, and the distinctively feminine outer robe, worn as at present, would allow of no outward visible change.

Petticoats could thus be abolished, and women would carry a lighter weight of clothes, though affording more warmth than now, besides being better distributed and more in accordance with sanitary principles—nay, we might also say, more conformable with the dictates of good taste, for what can be more beautiful than the flowing robes of a Greek-draped statue? Petticoats beneath such vesture would have marred its graceful lines.

Feminine under garments, instead of being more complex and numerous than those of men, might rationally be fewer and more simple. Thus, the innermost might be a combination woollen garment reaching from the neck to the ankles, with an over-vest or doublet of warm material, with Turkish trousers such as Eastern Mahometan ladies wear — but not necessarily visible. Stockings, shoes, and an over-dress as at present, would complete a sanitary costume, differing outwardly to the eye in no way from the present mode; but while it would involve the addition of modified trousers (Lady Harberton's divided skirt), it would abolish petticoat, chemise, and stays—the two former being most imperfect and unsatisfactory garments, and the last highly injurious.

Stays, instead of strengthening the back, as supposed by many, really weaken the dorsal muscles, their great evil being in nearly all cases an undue constriction of the waist. The effect of this compression is that the waist is indeed made smaller, but at a heavy cost—weakness, impaired health, and lowered vitality being the price paid for *supposed* (but really fictitious) gracefulness.

The ideal waist is shown in antique statuary; for a woman of medium height it should be not less than 25 to 27 inches, and the modern waist of 20 to 22 inches is an absolute deformity. Such compression of the waist involves a most injurious constriction of lungs, stomach, and liver—distorts and crushes in the lower ribs, and presses them upon these vital organs, so that life's machinery is clogged and checked; hence the organs cannot work properly, and ill-health or premature death is the result.

It is noted by physiologists that the types of breathing by men and by women are different—the diaphragm in the former working at each inspiration more than the muscles of the chest, whereas it is the reverse with women, their respiration being more of a chest movement. An American physician, however, having carefully examined the respiration of many Indian girls who had not worn stays, found the breathing process almost identical with that of men. This fact suggests how the action of breathing may be altered by the wearing of stays.

Stockings should be of wool or silk when practicable—cotton is not a good material for them; and the best type for health and comfort are made with separate divisions for toes, as in the case of gloves. In some schools girls are taught to knit stockings, so that the poorest household may be readily supplied with warm stockings. It is needless to add, as before mentioned, that garters, if worn, should be above the knee, so as to compress the leg where resistance is offered by tendons; but the preferable mode is to abolish them and wear suspenders instead.

Gloves in the summer are an article of ornament rather than of necessity; and in winter warmth is best obtained from woollen, rather than from kid gloves.

It may be well to close this section with a quotation from an American lady, contained in Dr. Treves' manual on clothing, which sets forth very clearly the unsatisfactory character of women's present under-dress.

"The limbs have not half the amount of covering which is put upon the trunk of the body. Many garments have no sleeves, and what sleeves there are either come to an

end a few inches below the shoulder, or they are loose and flowing at the wrists so as to expose the arm as far as the elbow to the cold air. As to the legs, the clothing, which should increase in direct ratio to the distance from the body to the feet, diminishes in the same ratio. Thin drawers, thinner stockings, and wind-blown skirts which keep up constant currents of air, supply little warmth to the limbs beneath. The feet, half clad and pinched in tight boots, are chilled in consequence. The trunk of the body has as many varied zones of temperature as the planet it inhabits. Its frigid zone is above, on the shoulders and chest; for, although the dress body extends from the neck to the waist, most, if not all, of the garments worn beneath it are low-necked. The temperate zone lies between the shoulders and the belt, for that region receives the additional covering of under-vest, corset, and chemise. The torrid zone begins with the belt and bands, and extends to the limbs below, for all the upper garments are continued below the belt and all the lower garments come up as far as the belt, so that the clothing over the whole hip region must be at least double what it is over any other section. But it is more than double—it is quadruple, for the tops of all these lower garments have a superfluous fulness of material which is brought into the binding by gathers or by plaits."

The **garments of the aged** and generally **of people in ill-health** should be somewhat warmer, as the circulation is slower and greater difficulty occurs in sustaining the animal heat. **Infants** also require warm clothing, because their heat-producing powers are feeble and without proper

clothing they may readily be injuriously affected. For infants, as suggested by nature, the head must be kept cool, and their garments should be mostly of wool, warm and few in number, so made as to allow of dressing the child without turning it over and over. The long robe is objectionable; the common binder is worse. It should be an absolute rule that, while the clothing is warm and complete, it should never be tight; a tight bandage round the body cramps lungs, heart, stomach, and liver, leading to deformity and weakness, even to death.

For **older children** little more need be said beyond the principles already laid down. Clothing should be light and sufficiently warm, and the body should be evenly and perfectly covered with clothes. To leave in cold weather arms and legs bare, and perhaps necks too, is a great fault. People talk of hardening children by such means, but the experiment is a dangerous one, and assuredly swells the record of mortality. Children should certainly be warmly clad. The radiating surface of their bodies is relatively greater than that of adults; and it is stated that one-sixth of the deaths of young children in Great Britain arise from cold. The just mean has to be taken between unduly exposing children to the weather and improperly coddling them up so as to make them delicate as hot-house plants. One thing more, as a golden rule, there must be no constriction of the waist, and garments should not be thickly clustered there. Where petticoats, &c., are worn they should hang directly or indirectly from the shoulders; but in dress generally for all ages, for both sexes, one object is to be kept steadily in view—the even maintenance of the body's temperature.

CHAPTER VI.

CLEANLINESS.

LORD PALMERSTON truly said that dirt was only matter in the wrong place; but it becomes a very serious affair if we suffer it to remain in the wrong place, knowing, as we do, that it forms a nest for disease germs. Further, uncleanliness lessens our comfort, destroys our self-respect, impairs the bodily powers, endangers health, and tends to shorten life. With many animals we observe some movements intended to remove matter that may adhere to their mouths, skin, or fur—as, for instance, when the cat cleans her face or the dog licks his hairy coat. If the horse rolls in the sand or the pig wallows in the mud, it is really to cool his back and to free himself from parasitic insects; while the domestic fowl, for a similar reason, requires a dust-bath.

The state caused by the removal of dirt we style cleanliness; in case of its non-removal from person or dwelling, we then speak of a state of uncleanliness.

George Herbert indicates the proper divisions of this subject when he quaintly says, "Let thy mind's sweetness have its operation upon thy body, clothes, and habitation," and we shall therefore speak of them in this order.

To begin with the person:—**Hair, teeth, and nails** should be kept scrupulously clean. Dirty nails are disgusting; dirty teeth are not only offensive, but become liable to decay; and thick, dirty hair is horrible to contemplate—it may even harbour parasites. The teeth should be cleansed each morning and evening, to remove

fragments of food that would otherwise injure them. A brush with cold water will do, with or without some safe tooth wash or paste, care being taken to avoid using any gritty substance that would scratch off the tooth's enamel or any acid that would eat into it, for when that hardest part of the tooth is corroded the rest of it speedily goes. If, however, through illness or premature decay, a person loses many teeth, artificial ones should be obtained, so as to grind the food effectually and not to throw too much work upon the stomach. Many a case of indigestion is due to the insufficiency of teeth.

The head should be cleansed by periodical washings, and if the hair be naturally dry some simple and innocent wash may be used. Dyeing the hair is unwise and injurious, apart from other objections.

But the great scope for bodily cleanliness lies in the removal of waste matter from the **skin,** the skin being a great organ charged with the daily work of removing waste matter; nay, if such waste, which is dead organic matter, be not removed, sickness or something worse must follow.

A story is told of a little Italian boy who, for the purpose of a Roman pageant, was gilded over and furnished with a pair of wings. In a few hours the child died, through the system being poisoned by the impurities retained in the skin, which should have found their natural vent through its pores. These tiny pores—of which there are ever so many millions—are channels and drains whereby, in the form of perspiration, waste and harmful matter is thrown off from the body. Two pints of sweat daily exude from the skin of an adult, and if kept in they

become poisonous matter or nourish poison germs. Here, too, may be noted the danger of what is called throwing in the perspiration by a cold.

Hence arises the need for keeping the skin clean. To some extent it cleans itself; but proper cleanliness requires that we should frequently wash the body all over, using some substance like soap, which, mixing with the oily substance of the perspiration, enables it to be cleaned away.

If people wish to be healthy, **the daily bath** should be almost a religious duty. It would not only make them clean and comfortable, stronger and more robust, but would actually bring about a feeling akin to self-respect. In a warm climate a cold bath can be taken by most persons all the year round; and by a bath is meant not only wetting but also soaping and rubbing the skin, so as to get rid of all impurities. In colder regions little less ought to be attempted, and there is even some virtue in sponging the body by sections, or in rubbing it with a wet towel, as may be required by delicate people who cannot withstand the shock of cold water. The reaction after the bath may be deemed the test of suitability. Cold baths may be taken without danger when the body is hot, provided there is no exhaustion, and that the ablution is quickly performed. If the body be exhausted, grave injury may be the result. A warm bath freely opens the pores, and in cool weather makes the bather somewhat liable to take cold. For a great cleansing and purification of the skin nothing equals the Turkish bath, but for weakly persons the strain of such a bath is too severe. In dealing with the skin let us remember its

threefold function—as a covering, an organ of sensibility, and a drain—and treat it properly.

The skin cannot, however, be kept clean if it be covered with **dirty raiment**; and Dr. Richardson lays much emphasis on the necessity for cleanliness of clothing, declaring that uncleanly garments create conditions favourable to disease, and that clothing, when saturated with the excretions of the body, must prevent bodily exhalations from coming out, causing thereby dulness, oppression, headache, nausea, and weakness. "Health will not be clothed in dirty raiment."

It is hardly going a step farther to say that not only ought our garments to be clean, but likewise our **bed-clothes**; from dirty beds or bed-clothing foul, poisonous matter may re-enter into the blood through the pores of the skin, and also may be introduced into the lungs when we breathe.

Cleanliness is not complete without great regard being paid to the **house,** though on this head something has been said in the chapter on dwellings. Carpets, shelves, books, walls, rubbish, and the space below heavy articles of furniture—all are peculiarly liable to gather dust and dirt, and to become a receptacle for the refuse of insects and decaying matter—in other words, a suitable gathering ground for poison germs; all, therefore, need constant watching and frequent cleansing. By Mahometans and Jews washing is more or less a religious duty, and most strictly so among Hindoos. With ourselves it should be no less so, not only by reason of physical danger to others and to our own selves, but specially because of the moral contamination that is begotten by dirty surroundings, for

the effect of cleanliness is absolutely to raise man's moral nature. Nay, as John Wesley said, "Virtue never dwelt long with filth, and cleanliness is next to godliness."

CHAPTER VII.

EXERCISE, REST, AND RECREATION.

A CERTAIN amount of **exercise** is needful for everybody; and is obtained in various ways, often through the simple performance of common duties, or by manual toil, walking, or physical games; and occasionally in a systematic way, by a course of gymnastic training. The general effect of exercise is to strengthen the muscles and to promote the healthy action of all the bodily organs. With vigorous but not undue exercise the respiratory action is quickened, the chest capacity enlarged, the quantity of inspired air greatly increased, and waste matters are more readily thrown off. The heart's action becomes at once more vigorous, the improved circulation diffusing a healthy glow over the system; the digestive organs are made to work better, the skin exerts its function more freely, the brain itself is freshened, and the invigorated body is rendered more capable of restful sleep.

In the young we find a strong inclination to activity, which shows itself in a certain restlessness, ceaseless movement, and love of play. The little child, the lamb, the kitten, are all alike eager for play; and this desire is the expression of a natural instinct implanted for a wise purpose—less perhaps as a vent for the overflowing

energy of childhood than for the health-giving results that follow vigorous exercise.

But another need of exercise is found in the fact that parts of the body when not used or exercised fail to attain a proper development. The matter is thus tersely put by Dr. E. A. Parkes :—

"**Parts when used grow,** when not used waste and become small. The conditions of growth are that a part shall be exercised, and shall be supplied with food. This is true not only of every muscle and nerve in our body, but of mental and moral qualities. The proper regulation of exercise forms, then, one of the most important rules of this period (the period of youth), and the object to be aimed at is to exercise all parts of the body which the will can influence."

The familiar instance commonly quoted is the blacksmith's arm, which becomes developed beyond the rest of his body. Again, the Turkish porters who carry immense burdens can do so only through the constant strengthening of the muscles of back and legs through bearing heavy loads; and the same may be said of the Chinese pedlar who carries two baskets of merchandise or vegetables slung on a wooden staff, and who, through the strengthening effect of practice, carries easily a load that many men could hardly lift.

Were it not for physical exercise, the body would stagnate and healthy development would be arrested; the muscles would grow weak and flaccid, the organs sluggish, the will inert, the body fat and incapable of exertion, whereupon disease would fasten upon the system and destroy it. Happily, even without any intelligent pur-

pose, necessity urges us to some exertion. We walk at least part of the way to our business; while occupied with it we more or less move about; if engaged in mechanical trades we may have much wholesome exercise; and, if working on a farm, the conditions for healthful exertion are still more favourable, as our exercise is taken in the fresh air.

Of the various kinds of healthful exercise we may first mention **walking,** which acts on the muscles of the legs, and in a less degree on those of the trunk, besides increasing the action of the lungs. **Running,** too, is a valuable exercise, but requires to be cautiously practised, as runners are apt to put too much strain upon lungs and heart; and in this, as in every violent exercise, the effort must be led up to by gradual steps, while undue exertion must always be avoided. **Cycling** or **riding on horseback** are admirable exercises, stimulating the muscles of legs and trunk, and specially benefiting the lungs. **Swimming,** again, apart from its other recommendations, is one of the best of exercises, as all the muscles are brought by it into harmonious play, while the lungs are made to work with beneficial freedom. Much good, too, is done to the muscles of the back and abdomen by **digging,** a most wholesome open-air exercise. **Rowing** next claims a place as a valuable exercise. It brings many muscles into work, particularly those of the arms, shoulders, and loins.

Next to these exercises, as factors in healthy exertion, come **athletic games,** which, bringing the players within the wholesome influence of fresh air, engage their minds in pleasurable occupation, causing friendliness and cheer-

fulness of disposition, and bringing into play most parts of the body. Thus, cricket is the greatest boon to boys; but girls, as well as boys, should have a share in such amusements as running, rowing, and driving a hoop. It is a mistake to restrict them to dancing, tennis, and the skipping-rope. Battledore and shuttlecock is a very healthy game for girls.

But the best of all exercise is that given by a course of **gymnastic training,** under the direction of a careful instructor. Rightly guided, such a course will lead to harmonious development for each part of the body. The muscles of the arms will have no undue strain, as in rowing when unrelieved by other exercise, nor the legs and chest, as in running; but the trunk also will have its proper share, and will be made equally strong without any partial or one-sided development.

It is a mistake to suppose that gymnastics can be practised only in the gymnasium. A rod and a pair of light dumb-bells will afford some most healthful and strengthening indoor exercise: flexions of the body, arm-exercises, and balancing alternately on each leg, make up a good variety; and, if to these a pair of Roman rings is added, a wide field is open for gymnastic practice at home.

The interest and precision of collective gymnastic practice is much enhanced by doing exercises in time to music. **Singing,** also, may be reckoned a gymnastic exercise of some value, tending to develop chest and lungs. The singer is obliged to hold up his head so as to assume a good position for the play of the lungs; and it is said that, besides other advantages, incipient chest disease has been checked through the practice of singing.

Excessive exertion, often brought on by emulation in athletic contests, is of course most injurious, tending to weaken the action of heart and lungs; indeed, it is too often the case that athletes become unsound in these two organs through undue training and excessive exercise. It must be borne in mind as a cardinal rule that the object of gymnastics is rather to develop and strengthen the body than to enable it to perform a number of muscular feats; and, as a general principle for determining whether exercise is or is not excessive, the following rule may be wisely laid down:—

"In all exercises it should be a condition that when completed a very few minutes' rest should restore all parts to their former state. Thus, anything like soreness of muscles, breathlessness, or quick beating of the heart, lasting after exercise, shows it has been too prolonged or too fast."

Hitherto we have spoken only of the advantage of gymnastic exercises. A word or two as to their **drawbacks** will now be in place. Happily, these drawbacks are trifling, the chief danger of all physical exercise being a liability to excess; but a careful instructor will check exercise at a safe limit before reaching the borders of excess. In the next degree is the risk of catching cold through becoming overheated; and persons very warm from their exertions should therefore avoid draughts or sudden chills, which may cause colds, rheumatism, or even such evils as inflammation of the lungs. A further precaution, when heated after exercise, lies in putting on a woollen wrap or overcoat. Sprains and other accidents, too, may sometimes happen; but with ordinary care they ought to be of very rare occurrence.

In speaking of **exercise** as a requirement of health, it was said that our common duties and ordinary business usually afford most of the exertion needed for health. The supply of our daily wants involves work, and this work keeps us in health and becomes the great law of our lives; indeed, in the successful performance of his work man generally achieves his greatest honour and fullest happiness. Carlyle says, "The modern majesty consists in work. What a man can do is his greatest ornament, and he always consults his dignity by doing it." To be a mere idler is regarded, equally among rich and poor, as something despicable; and no one dares to call or even think himself such. For one's moral and physical nature some definite labour must be undertaken; and Humboldt says, "Work, according to my feeling, is as much a necessity to man as eating and sleeping. Even those who do nothing, which to a sensible man can be called work, still imagine they are doing something. The world possesses not a man who is an idler in his own eyes."

But labour is more than a law of our being; it is also a nurse to our pleasures. "The sleep of a labouring man is sweet." It gives a zest to rest and recreation, and enables us for a time to blot out the consciousness of bodily or mental trouble. "The labour we delight in physics pain." The bow cannot, however, be kept always strung—it must sometimes be relaxed; sufficient exercise must be followed by sufficient **rest**. The human system is not a machine which can work without cessation, and after a certain time fatigue warns us of the danger of over-effort. We then **rest so as to renovate the machinery and regain strength.** After food, also, rest should be taken

to allow of the proper working of the digestive functions. In short, long labour dulls the brain and tires the body, while rest renews both.

The activity of the **nervous system** is greatest in the morning, declining gradually towards night; hence children's most difficult lessons should take place early in the day. Thus, where practicable to do otherwise, a schoolmaster should not begin the school day with a restful lesson such as writing, and end it with severe tasks such as grammar and arithmetic.

Nor should we omit here to notice as prevalent in too many schools the evil of giving young children heavy home tasks as preparation of lessons for the next day. It is, doubtless, good that a child should occasionally be thrown on his own resources, and, by trying his own unaided strength, should learn to be self-helpful and self-reliant; but, too often, **home lessons** swallow up the whole of a child's evening, and, when the body is tired and the brain dulled with physical and mental effort, the addition of hard tasks is downright cruelty —and, in the opinion of some medical experts, is often a positive injury. They have the bad effect of making a child hate his lessons, of stupefying instead of brightening his mind, and of shutting him out from the cheerful occupations and social enjoyments of the family circle—this last being an educating influence that ought on no account to be dwarfed. One eminent physician has even gone so far as to assert that "children sent to bed with lessons on their mind are liable to attacks of a kind of epilepsy." It is believed that by slightly lengthening school hours pupils might be wholly or almost

wholly relieved of this burden; half-an-hour's extra study, when the mind is fresher, under the eye of a teacher, would probably be more effective than thrice that time so spent in the family circle with its home distractions and interruptions.

Rest may be partial or total. It is partial when we simply change our occupation, bringing into play a fresh set of muscles or other organs, as, for example, a walk after long study, or the perusal of a book after hard rowing. **Sleep** appears to be the only total rest—sleep is the rest of the brain, when all the other organs, which own the brain as their master, cease to get its directing mandates, and must therefore also rest. During undue mental work there is an excess of blood flowing to the brain; but the reverse takes place in sleep, in which state it has a deficiency of blood for work.

There is constantly going on in body and brain a destruction and renewal of matter; and, as every exertion, nay, even every thought, is accompanied by a destruction of nervous tissue, sleep becomes a necessity for regenerating the tissues so destroyed. This priceless boon comes to all as "tired Nature's sweet restorer," to the good and bad alike. The Persian poet says, "God gives sleep to the bad in order that the good may rest undisturbed." The tired and the hungry, the sick and the sorrowful, are blessed by it with happy forgetfulness of their troubles; while to the strong and diligent it gives renewed vigour for good work and fresh happiness. What did old Sancho Panza say?—"Blessings light on him that first invented sleep! It covers a man all over, thoughts and all, like a cloak; it is meat for the hungry, drink for the thirsty,

heat for the cold, and cold for the hot—in short, it makes the shepherd equal to the monarch, and the fool to the wise."

This great restorative is sometimes refused to us. In time of great excitement or illness sleep is often wooed in vain; but, except under medical orders, the taking of narcotics should be carefully avoided. Doses of sleep-producing potions, if repeated, require to be increased; they render the brain irritable, and do grave injury to the nervous system. If unable to obtain sleep in warm weather, bathing the face with cold water and lying on the cool side of the pillow may have a good effect; and a wet compress on the stomach has also been tried with good results. When practicable, a stroll in the cool night air may be also beneficial for the same purpose. In cold weather sleep can generally be obtained by going to bed with feet and legs warm, and, while warm, wrapping them up in flannel. One authority on this subject, recommends some easy work as sewing, knitting, or reading one's self to rest, chess playing, or reading aloud, just before retiring to rest.

Speaking generally, **one-third of our life is passed in sleep**; but the exact amount varies according to age, occupation, and temperament—young children and active brain-workers requiring more sleep than others. Some persons, as the great Napoleon and Lord Heathfield, the defender of Gibraltar, could do with from two to four hours sleep daily for many weeks; but few people could manage to keep well for even a few days on such a limit. The quaint dictum given by George III. as to the proper quantity of sleep was "six hours for a man, seven hours

for a woman, and eight for a fool;" but the King's division is more clever than accurate.

In early childhood very much sleep is necessary, as growth of the body largely taxes our strength. An infant sometimes sleeps twenty hours out of the twenty-four; at 4 years of age, a child is said to need about twelve hours of sleep; at 7, eleven hours; at 9, ten and a half hours; at 14, ten hours; at 17, nine and a half hours; at 21, nine hours; and at 28, eight hours, which may be considered as about the normal amount for an adult. A little perfectly sound sleep, however, is of more restorative power than longer hours of broken sleep; and our earliest slumbers, the nearest to the close of our daily toil, are found to be the soundest and most refreshing.

For sleeping no constrained **attitude** should be chosen, but an easy one, such as lying extended on the side or the back; and the mouth must not be below the bedclothes, where it would breathe impure air. Lying on the side is the more common attitude; but for those who can comfortably do so, lying on the back, with arms extended along the sides, affords the ideal position of rest. Persons who stoop much, or who have contracted chests, find the side position more comfortable; and of the two sides, it is preferable to lie on the right, as the food then gravitates more easily out of the stomach, while the liver also does not press on the upper part of the intestines. Persons who have one weak lung should lie on it, leaving the sound one free to expand.

We should **go to bed in good time,** because sleep comes more readily in the early hours of darkness than in the later hours. Sleeping after meals and taking naps

during the day are practices that after a while are likely to cause wakefulness at night. In this, as in other matters, it is important to form good habits. Before retiring to rest, the process of digestion should be nearly complete; and, as that process requires for its completion a time varying from one to five hours, it is laid down as a generally safe rule that if a meal be taken within two hours of going to bed, it should be a light one and consist of simple food. To this may be added a doctor's opinion as to the result of heavy feeding or drinking:—"The sleep induced by heavy feeding is not natural, while that which follows upon the use of strong drink is, beyond question, a condition of blood-poisoning and stupor."

The great Duke of Wellington, himself an early riser, used to say, that when one turned in bed it was time to turn out. It is hardly necessary to say that we ought to **rise early**, forming a habit of getting up promptly at a regular hour; and that on once awaking we should forthwith rise, being careful to avoid the **pernicious habit of dozing.** On this matter, we will give the opinion of a doctor who says:—"Adults should make it a point of duty to overcome the habit of dozing. It is one of the most disastrous of lazy and morbid practices. The state into which the sluggard falls when he turns sullenly or irritably on his pillow is not 'sleep,' but a miserable burlesque of that state, in which his consciousness lies revelling in dreams, or knowingly neglecting the call of duty. . . . Perfect self-control and self-possession can only be secured by decision and thoroughness. If you sleep, sleep. Dozing is a half state, and should

be shunned. The sense of weariness and headache, with which most persons who doze in the morning are troubled, should suffice to show that the habit is physically bad. Its mental effects are equally injurious."

A wondrous state is sleep! We ought indeed to make a proper use of this great boon to man, one of Heaven's choicest gifts, the gracious comforter of so many, the blest restorer of all—

> "Sleep that knits up the ravelled sleeve of care,
> The death of each day's life, sore labour's bath,
> Balm of hurt minds, great Nature's second course,
> Chief nourisher in life's feast."

Recreation.

The subject of **recreation** claims a little attention, although in dealing with "Exercise" it has already been slightly touched upon as far as it consists in those physical games which promote strength and development; but something of its **mental effects** should now be added. Mind and body are so closely interdependent that one cannot be in a sound state if the other be out of order; and, in the young especially, the mind is kept in a healthy condition by the constant bodily movement and physical games of childhood, and particularly by those games which cause rapid passage through the air, and so increase respiratory action. In manhood and later life intellectual studies, indoor games, and social amusements supply the mind with recreative exercise which keeps it happy and healthy. Without this mental employment we could not get that contentment and cheerfulness which beneficially engage the attention and prevent

mental stagnation, or idle day-dreams. "All work and no play make Jack a dull boy." Nay, it may make him a bad boy as well.

If in ordinary health the bodily appetite is sickly, and can be tempted only with dainty food, this is a sign of ruined digestion and failing bodily health. Equally so is it when from over-indulgence in exciting pleasures a person's zest is lost for the wholesome enjoyment of games, books, music, or social intercourse—it shows that his tastes are unsound and his faculty for rational enjoyment worn out; whereas, on the other hand, one of the best signs of mental health is cheerfulness and contentment with our surroundings—a disposition, in fact, to make the best of everything. Plutarch bids us learn to be pleased with any station which falls to our lot. "Learn to be pleased," he says, "with everything—with wealth, so far as it makes us beneficial to others; with poverty, for not having much to care for; and with obscurity, for being unenvied." To these precepts Sir James Mackintosh adds an important qualification. "It is right," he says, "to be contented with what we *have*, but never with what we *are*."

As to **cheerfulness**, poets and philosophers have joined in declaring it not less a social obligation than a necessary accompaniment of healthfulness and longevity. Bacon says of it, "To be free-minded and cheerfully disposed at hours of meat and sleep and of exercise is one of the best precepts of long lasting;" while in another way of looking at cheerfulness, Sir Philip Sidney gracefully remarks that "the lightsome countenance of a friend giveth such an inward decking to the house where it lodgeth, as proudest

palaces have cause to envy the gilding." Shakspeare tells us—

> "A merry heart goes all the way,
> Your sad tires in a mile-a."

Cheerfulness and serenity of mind are real factors in the condition of health, and the reverse of it depresses the brain and lowers the physical vitality. Of course, much more might be said of the merit of cheerfulness in respect of its causing us to become agreeable to our fellow-men, and because it promotes the social virtues, making life thereby easier and happier. But in a work on hygiene we have less to do with this aspect of cheerfulness than with its direct tendency to aid in maintaining a good condition of physical health, and still more even of mental sanity. It is needless to point out how trouble affects the mind, how loss and disappointment depress it, destroying its spring and elasticity, and weakening the desire for effort, except in brave and noble-hearted men whose sense of duty will make them strong and resolute even in disaster. A sea of troubles will fail to overwhelm them; for their faith and resolution can rise erect, and struggle against the cruellest destiny.

Thus, we may regard cheerfulness as an indicator of health, and from its absence in adults or children, we judge that something in body or mind is wrong. One of the great thinkers and most brilliant writers of the century has given this lesson in such appropriate language that we can do nothing better than quote it as a fitting sequel to these considerations. "Cheerfulness," John Ruskin says, "is just as natural to the heart of a man in strong health as colour to his cheek; and wherever there is a habitual

gloom, there must be either bad air, unwholesome food, improperly severe labour, or erring habits of life."

CHAPTER VIII.

WATER.

NEXT to air there is no substance so common as water; it covers the larger part of the globe, and from the great fountains of the deep there goes forth a perpetual flow of it into the atmosphere, to be spread over the whole world. Evaporated by the sun, and drawn up in a state of perfect purity from the ocean, it softens and tempers the air, refreshing plant and animal; and, when no longer needed in the great cisterns of the heavens, it falls in refreshing rain, renewing and reviving all creation. It washes the air through which it passes, cleanses hill side and lowland, and passing on again to spring, lake, and river, finds its home again in the ocean, from which mighty storehouse it sets forth to run anew its beneficent course—purifying, nourishing, renewing.

As we are here dealing with it only in its hygienic aspect, we have nothing to say as to the many ways in which water is the friend of man—how it works our engines, extinguishes conflagrations, feeds our crops, and bridges over distant countries. The aspect in which it here specially concerns us is that it cleanses the body, the home, the street; forms a large portion of the earth's surface, of all food, and the larger part of the human body. **Water is diffused** to a far greater extent than may be imagined by most people. Most structures and organs of

the body, even bone, are largely composed of water; and of the body of a man, weighing 154 lbs., not less than 111 lbs. of this weight consist of water; even a block of wood contains 12 per cent. or more of water, while vegetables have a much larger proportion—cabbages and turnips ranging from 85 to 90, while strawberries, peaches, and grapes have even more.

Water is, indeed, the **prime beverage of life**, the foundation and chief part of all thirst-allaying beverages; of a half pint of pure milk all but about a tablespoonful is water. The craving for water is equally noted in the vegetable and animal kingdoms. In the latter it arises from an instinctive necessity for the maintenance, composition, and function of every tissue.

The quantity of **water in air** is about 1 to 1½ per cent.; when there is too little, the air rapidly abstracts moisture from animals and vegetables, and has an unpleasant parching effect. When air is saturated with water (at 80° Fahr., 2 per cent. may be present), the moisture of our bodies does not pass away from skin and lungs rapidly enough for health: hence the unhealthiness of fogs and mist. The fog of towns is very objectionable, being often not merely a cloud touching the earth, but a mist mixed with chimney gases and smoke. Here we find one evident reason why factories and locomotive engines should, if possible, be made to consume their own smoke, to say nothing of the saving in fuel that would be a direct result of such proceeding.

The **chemical composition of water** is two volumes of hydrogen united to one of oxygen; but as oxygen is sixteen times heavier than hydrogen (the lightest substance in nature), the quantity of oxygen in water is eight

times as heavy as its hydrogen. Strange, indeed, that these two elements should form the fluid water which extinguishes fire, seeing that hydrogen by itself is highly inflammable, and, in a compound state, lights our streets, our buildings, and even cooks our dinners; while its associate, oxygen, is more than fuel to flame, for without it no fire can exist.

There are a few other facts about water which may conveniently be given here. First, it is the only thing that expands with cold. From 39° to 32° Fahr. this is the case; and from this expansion water-pipes in cold countries often burst. When the barometer stands at 30 inches, water boils at 212° Fahr.; but with less pressure it boils at less. Hence on the top of Mont Blanc, an elevation of 15,781 feet, water boils at 185° Fahr. In the form of snow, water forms a bad conductor of heat, and protects roots and seeds from an intense degree of cold. The freezing of the clods of earth breaks them up, and exposes them to the action of the atmosphere. Like rain, water becomes charged with the gases of the air, 25 gallons of rain containing about five pints of gases, chiefly oxygen and nitrogen. When expanded into steam it occupies 1,600 times its former space. Steam is coming to the fore as an agent of great power in the way of washing, cleansing, and disinfecting.

The **sources of water** are springs, wells, lakes, rivers, oceans. The water of the ocean and salt lakes cannot, of course, be drunk; but evaporation, artificial or natural, takes off only pure water, without admixture of any other element—nay, except as distilled water, it is never wholly pure. It sinks through the air as rain, and absorbs a

certain quantity of carbonic acid. This gives it, on reaching the soil, a greater solvent power, and so it can more readily dissolve matter therein to prepare food for the plant. In its passage through air and soil, especially the latter, it takes up certain salts in solution, and it is then called hard water. When so strongly impregnated with certain minerals, as iron, magnesia, or sulphur, as to have a perceptible taste and medicinal qualities, we call the source of such water a mineral spring.

One division of water, used for domestic purposes, is into **hard and soft**. When, in its passage through air and soil, it takes up to any great extent such matter as carbonate of lime, sulphate of lime, sulphate of magnesia, oxide of iron, alumina, silicon, and carbonic acid, we call the water hard, and find that it resists the action of soap or the drawing of tea—hence its use is inconvenient and wasteful; but hard water can be made soft by boiling it (which expels the carbonic acid), or by putting into it a little quicklime. Rain, river, and lake water is commonly soft. A water holding in solution 3 or 4 grains of mineral matter per gallon is soft; one with 8 to 10 grains would be deemed a distinctly hard water; and 20 grains per gallon would represent extreme hardness.

The following classification of **drinking water**, with reference to the source from which it is obtained, is given in the Sixth Report of the Rivers' Pollution Commissioners:—

Wholesome	1. Spring water	Very palatable.
	2. Deep well water	
	3. Upland surface water	Moderately palatable.
Suspicious	4. Stored rain water	
	5. Surface water from cultivated land ...	Palatable.
Dangerous	6. River water to which sewage gains access ..	
	7. Shallow well water	

The requirements for **pure water** have been thus defined by an engineer, who insists that water should be—

1. Wholesome for drinking or cooking;
2. Soft for washing, and that it should have no power to injure leaden pipes;
3. Clear, colourless, bright, free from odour or taste;
4. Not causing a deposit when boiled;
5. Free from vegetable or animal organisms; and,
6. Well aerated:—Eight or more cubic inches of gases per gallon (say 2 oxygen, 6 nitrogen) making it agreeable and refreshing when drunk.

Water may be contaminated in various ways, and so rendered dangerous for drinking. Mineral impurities are chiefly such as make water hard; but when arising from the dissolving of a leaden pipe, much injury may be caused. But the most serious danger arises from the presence of animal and decaying vegetable matter. From drinking impure water, various diseases spring—tape-worms, lead-poisoning, diseases of the stomach and bowels, goitre (a swelling of the neck, caused by hard water); but the gravest danger arises from drinking water contaminated with organic matter—diphtheria, cholera, typhoid fever, all owe their origin to this source, the last sometimes arising through breathing air poisoned with sewer gas, but in most cases through drinking water or milk that contains matter which has passed though the body of an infected person. Filtering such water is not sufficient to purify it—it must be boiled to render it harmless. Both cholera and typhoid fever are known to be caused by a small germ, and the close connection between these diseases and an

impure water supply may be illustrated by the undermentioned tables :—

Period of Cholera Outbreak.	Water Supply from—	Deaths from Cholera.
	Glasgow—	
1832	Clyde (impure)	2,800
1854	,, ,, ...	3,900
1866	Loch Katrine (pure)	68
	London—	
1854	Thames water (impure) ...	12·5 per thousand
1854	From the river at Ditton (purer)	3·7 ,, ,,

Water supply may be contaminated in various ways ; thus, if taken from a stream into which sewage or the refuse of dye-works be poured, or if it receive the drainage from alluvial or manured lands, it must be impure. Then again, water-pipes may be damaged, and sewage or foul gases get entrance therein, or if they become empty they may draw in foul matter or sewage gases ; and it has even been asserted that fire-plugs in the streets sometimes allow of dirt being washed into the service pipes. But with wells (especially shallow ones) and underground tanks, there is a risk of sewage or other foul matter soaking into the reservoir, and rendering the water very dangerous. In the first and last ways here given, have arisen most cases of water pollution.

We **test water** mainly by its appearance. Looking downward into a tall glass vessel filled with pure water we should find it odourless and clear, with a slight bluish tint, and with no sediment. Organic vegetable matter imparts a greenish tint ; clay and sand a yellowish tinge ; peat

a dark brown, and sewage a light brown colour. If it do not appear pure, it should not be drunk, though boiling may render it safe.

The **daily supply** of water for large towns varies greatly. In Madrid it is said to be no more than $3\frac{1}{3}$ gallons per head, while in Rome it is as high as 160 gallons. Stagnant water, whether in a saturated soil or in festering ponds, is a deadly enemy to health. One of the reasons why trees promote the healthiness of a site is because they suck moisture out of the subsoil, and keep it dry. "Thus, in La Brenne, a tract of 200,000 acres, resting on an impermeable subsoil of earth, which ten centuries ago was covered with forests, interspersed with salubrious meadows and pastures has been converted by the destruction of the woods into a vast expanse of pestilential pools and marshes."* On the other hand, a part of Italy, where it was death to live, is being rapidly transformed into a habitable and healthy district by plantations of a tree called the bluegum.

But one of the great needs of water is as a cleansing agent for flushing our streets, channels, and gutters, and carrying away hurtful matter. Hence a good scheme of drainage is aimed at by most modern cities. In ancient times, streets were unpaved and became receptacles for filth, and the penalty of such neglect was duly paid. Cities were frequently visited by the most appalling plagues, which swept off a large portion of the population. As may naturally be expected, it is found that when drainage works are undertaken, the death-rate falls, sometimes considerably.

* Marsh's "Earth as Modified by Human Action," p. 205.

The refuse of our streets consists of manure, slops from houses, straw, paper, dust, shoe-leather, shoe iron, dead organisms, insects' eggs, scales from the human body, and disease germs. A proper system of sanitation aims at removing all rubbish and dirt in which disease germs find a cradle and a hiding-place. It will burn all rubbish that can be burned, and it will flush all channels that can be flushed.

Many towns have spent large sums of money for these or similar purposes. Islington and Newington (suburbs of London) have now establishments for turning refuse into a saleable manure. Leeds, Sheffield, Bradford, and Manchester possess similar agencies.

The city of Adelaide in Australia, with a subsoil surcharged with sewage, and with a very high death-rate, roused herself some years ago to teach her sister cities a noble sanitary lesson. In 1885 a system of deep drainage was completed, and the town sewage conveyed about four and a half miles away to a sewage farm of 480 acres, this area receiving the refuse of 70,000 people, for which it is found amply sufficient. The sewage is there strained through filter beds; the liquid portion—which ultimately becomes as clear as water—being carried away and distributed by wooden troughs, while the solid matter is trenched in. The result of the increased healthfulness of South Australia's capital is seen in the fact that the death-rate has become ten less in the thousand within the space of ten years; while later accounts represent the death-rate as still falling, being actually only fifteen and a fraction per thousand. An exact statement of this important change is here appended.

RETURN SHOWING DEATH-RATE PER 1000 OF THE POPULATION IN THE CITY OF ADELAIDE FROM THE YEAR 1879 TO 1889 INCLUSIVE.

	Before Deep Drainage.			Deep Drainage in course of Construction.			Since Deep Drainage was Completed.				
	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889
All causes ...	28·8	30·7	23·5	27·5	23·9	24·4	18·9	18·9	19·75	19·04	18·63

Here must be added a further quotation from Sir Lyon Playfair, who says—"Unless the soil upon which a city is built is well drained and ventilated, the dwellings of the city cannot be healthy. It is not in fevers alone that the influence of the soil is apparent. Probably consumption itself, that great scourge of this country (Scotland), is a disease like many of our fevers, arising and communicable from like hygienic deficiencies. It is greatly mitigated by drying and ventilating the soil, as well as by ventilating the dwellings.

After the sewerage of Salisbury had been made effective, the deaths from consumption fell 49 per cent.; in Ely, they fell 47 per cent.; in Rugby, 43 per cent.; and in Banbury, 41 per cent. Dryness and elevation and well-ventilated rooms are powerful means to prevent as they are to retard consumption. In the last generation, the average period of that sad disease was two years. Now, according to Dr. Williams, it is eight years. With pure air in the soil and in the dwelling, let us hope that the succeeding generation will point to it as a rare disease instead of one of the most common maladies of this country."

He also shows by a most interesting table how great has been the sanitary advance in London during the

past 200 years, and though only partly connected with water conservancy it is desirable to speak of it here. During the fifty years that preceded the Great Plague, about every five years a plague would break out; but in 1665 it ravaged London with fearful severity, killing about one person in every eight. The following year witnessed the Great Fire of London, which consumed the houses of the unhealthiest parts of the city, and led to a better style of building.

The startling falling-off in the mortality of London after the Great Fire is most suggestive. Sir Lyon Playfair says, "For twenty years after the Restoration there was an exceptionally high mortality, even for that epoch, in the metropolis, and no doubt throughout the kingdom. Macaulay describes it as a time when men died faster in the purest country air than they now die in the most pestilential lanes of our towns, and when men died faster in the lanes of our towns than they now die on the coast of Guinea." He was right, for the rate of mortality in London from 1660 to 1679 was no less than 80 in the thousand.

Let us put in a tabular form the rates of death at various periods since then. The annual deaths from all causes per thousand of the population were:—

1660 to 1679	80·0
1681 ,, 1690	42·1
1746 ,, 1755	35·5
1846 ,, 1855	24·9
1871	22·6

That filth, which ought to be burned or buried, should be sent to poison our rivers, is a most outrageous course,

and must cause many diseases, especially cholera, diphtheria, and typhoid fever. Fever germs, though so deadly, are very minute; and it is said that 50,000,000 of them could lie on a sixpence. The true aim of the disposal of sewage should be to feed vegetation with it, a plan already carried out in certain parts of England and Scotland. If the sewage be first taken to filter-beds, the solid part could be separated and converted into manure; while the fluid part could be filtered, rendered harmless, and drained off. It is said that one acre of land will absorb daily 2000 gallons of sewage.

Various proposals have been made for getting rid of slops and house refuse, as, for instance, a "dessicator," which by mechanical means should dry the sewage, and afterwards chemically alter it; or a "destructor," which should burn up the solid parts of it.

Crowded neighbourhoods, with small, ill-built houses, and imperfect means of drainage, are invariably less healthy than large buildings better drained, and, as might be expected, fevers and disease usually attack such places most severely. For instance, we may quote the cases of Collingwood and Kew, two suburbs of Melbourne parted only by a small river. The former is crowded, and built over with houses of a poorer type than the latter. Kew lies higher than Collingwood, and its houses are of a better class; its inhabitants are richer and dwell under more sanitary conditions. The following returns, for the years 1883 and 1887, show an amazing difference for two places so close to each other—thus :—

Year.	Death-rate per 1000.	
	Kew.	Collingwood.
1883	9·38	19·44
1887	9·40	21·68

TEMPERANCE.

CHAPTER I.

ALCOHOLIC DRINKS, ETC.

"Temperance is that habit by which we abstain from all things that tend to our destruction ; intemperance, the contrary vice."—*Hobbes*, 1640.

In the chapter on drink, we spoke of the necessary refreshment of the body, and of natural reasons for frequently taking fluid into the system; but very slight reference was then made to the evil influence of alcoholic drink. At the present stage, **intemperance in drinking alcoholic liquors** demands attention. Of course, there is intemperance of many kinds, as of speech, of exercise, of eating, of drinking. "Beware of self-indulgence. It is upon a basis of stern morality alone that a truly healthy life can be built up. Sloth, idleness, greed, luxury, inordinate eating and drinking, excess in any of the pleasures of life, all tend to destroy the body which they seem to pamper and satisfy."

Excess of anything is unwise, and generally harmful. Intemperance of speech would make us objectionable and disliked ; excess of exercise leads to disease of the heart ; while an undue quantity of food ruins the digestion and makes the body gross and inert.

But the worst of all these practices lies in the drinking

of alcoholic liquors to excess. There are of course many degrees of excess, some falling short of actual drunkenness; they are excess for all that, and consequently injurious, both morally and physically. A victim to this vice in its grossest form loses his vigour, his health, his business, and his self-respect, becoming finally a repulsive object, bringing ruin to himself, and sorrow and distress to his kinsfolk. Should he have a family depending on him, it is dragged down by his degradation to suffering, abject poverty, and disgrace.

Now, the general drink of mankind, as well as of the whole animal creation, is **water.** The mighty elephant, the massive rhinoceros, the strongest dray-horse, the fiercest tiger, the fleetest deer, need no other; and man himself, for the most part, drinks no other beverage than the pure, sparkling water that comes down from heaven like a blessing on the earth.

In all parts of the world, water is the chief, even when not the sole drink; though in most civilised countries **people mingle certain things with their natural drink in order to give it a relish**—to make it more tasty or stimulating. Thus, as we have already seen, in China, Great Britain, North America, and specially in Australia, an infusion of tea-leaves in hot water is made into a wholesome and palatable drink. For the south of Europe and many eastern nations, the coffee berry helps to make another innocent and pleasant stimulant; but, unfortunately, an unhealthy craving has led many to seek a more fiery drink. Thus the Chinese distil from rice a sweet spirit called samshoo; the Hindoo from fermented rice gets arrack; the

Slavonians of Austria and Turkey drink plum brandy; the Russians from the distillation of rye obtain vodka; and the European races generally make various fermented or distilled drinks, thus—they press the juice from grapes, plums, apples, and pears to make wine, cider, or perry, &c.; or beer, from boiling together malt and hops in water, and allowing the liquor to ferment; or, from the destructive distillation of sugar, grain, &c., they make spirits, as rum, whisky, gin; all these drinks having a greater or less proportion of **alcohol.**

This proportion varies greatly. According to Dr. Richardson, the strongest European wines, such as sherry and port, contain even more than 25 per cent. of alcohol. In ale, beer, and stout, the proportion of alcohol varies, mostly from 5 to 10 per cent. Of spirits, gin, as usually sold, contains 38 per cent. or more; whisky, 45 to 46 per cent.; rum, about 48; and brandy, generally about 53 per cent. The foregoing are the strengths given by Dr. Richardson; but Mr. Hayter, in his Year-Book for 1888–89, vol. ii., p. 359, quotes a different scale, given by "Cassell's Family Physician," as follows:—Beer, 5 to 6 per cent.; sherry, 14 to 16; wines generally, 8 to 19 per cent., but sometimes 6 to 25; brandy and whisky, 50 to 60; and rum from 60 to 70 per cent.

Basing his statement on this latter standard, Mr. Hayter remarks—"It has been laid down by authority that a glass of gin (two and a half ounces) is equal in alcoholic strength to a pint and a half of English beer (thirty ounces), or to four glasses of sherry (ten ounces); whence it follows that one gallon of beer, one-third of

a gallon of sherry, and one-twelfth of a gallon of gin are equivalent quantities."

We may here stay for a moment to inquire as to the nature of the substance which gives to these beverages their dangerous character. Water, as we have already seen, is formed by the chemical union of two gases—oxygen and hydrogen—two measures of hydrogen united with one measure of oxygen (H_2 O) forming water. But **alcohol** is a more complex fluid, being made up of two measures of carbon, six of hydrogen, and one of oxygen (C_2 H_6 O). There are other alcohols which contain different proportions of these three elements, but it will be sufficient for us to deal only with the common alcohol of spirituous liquors.

Certain preservative and medicinal powers belong to alcohol; but no one can pretend that for men, women, or children in health, any drink containing alcohol is absolutely necessary. Indeed, the liking for such drink is wholly acquired, and the first taste of it is usually nauseous.

The strongest men in the world, as the Turkish porters, never touch it; and when athletes desire to train for special feats of physical skill and endurance, as in boat or foot races, they always abstain from excess in alcoholic drink (frequently abstaining altogether), knowing that only thereby can the utmost physical strength and highest staying powers be secured.

No healthy person has ever suffered through want of alcohol; though, on the other hand, much evil is wrought by it. Excess in the use of it has proved a worse foe to liberty and life than any ruthless invader or foreign tyrant could

be; while, compared with the number of its victims, the most bloody wars show a trifling loss. Nay, it is a traitor in our very midst; and the most cruel, most rapacious enemy, is merciful compared with the tyrant alcohol, when it enslaves men, and robs them of their health, their reason, and their humanity.

It is difficult to give exact statistics, showing the great **mischief caused by drinking stimulants**; as, though the habit is often the efficient cause of serious ills, it is not easily separable so as to indicate with certainty how much is due to intemperance and how much to carelessness, or other circumstances; though, perhaps, in most cases, drink has led up to that carelessness or those other circumstances.

Thus a large number of accidental deaths are due to drink; but in any single case, who can accurately say what proportion of such calamity is due to carelessness or to actual intoxication, even though, perhaps, intoxication heightened that carelessness or was its simple cause? It is at least indisputable that many accidents occur solely through intemperance. For example, fires may be brought about sometimes by the carelessness of children, but probably it is more often occasioned by the stupidity of half-conscious and staggering drunkards. A curtain is set on fire, a match is dropped on inflammable matter, and disastrous destruction of property follows—perhaps with loss of life also—this being one of the cruel results of intemperance.

But worse than this even—does any one doubt, can any sane man deny, that this evil seed produces an unceasing crop of misery and crime? Drunkenness reaps a fearful harvest. How many brutal assaults, nay, even murders,

have not been committed by drunkards in their stupefied and debased condition! What abject poverty and bitter want—a state which is a recruiting ground for crime—are brought about simply by intoxication! Drunkards, infected with the lust of drink, are known to do most cruel and wicked acts in order to satisfy their horrid craving. Money which should buy food and clothing for their wives and tender little children is blindly spent on liquor which poisons their moral nature. The bare necessaries of life are then sacrificed to the brutal selfishness which seeks only the miserable satisfaction of gulping down a fiery spirit which consumes the drunkard's health, makes him a wretched outcast, and brings him at last to a lunatic asylum or to an early and dishonoured grave.

In another direction, it is impossible to tell what the world has lost through drunkenness. Many men of great learning, of the keenest intellect, of the greatest capacity for action have been slaves to this vice—an evil which has shadowed their character and shortened their lives. Has not this been the case with kings, as Alexander the Great; with poets, as Burns; with dramatists, as Sheridan; with statesmen, as Pitt and Fox? The loss in withered energy, blighted careers, and genius quenched by premature death, is such as the world can never realise.

It is, indeed, unhappily true that through this awful craving for drink a man sinks down lower, ever lower, until the terrible end arrives. All that a true man holds most precious is basely sacrificed. The drunkard's wife may be shivering for want of clothing; his children may be starving through lack of food; nay, his family may be

dying of sickness and want; but, all the same, the wretched creature must satisfy the horrid appetite that gives him the conscience of a fiend, the heart of a monster. The little money which would save their lives and afford them common comforts is used for buying what is certainly to him a poison that will wither up his manhood, and make him a curse to his generation.

We have before said that the first taste of strong drink is nauseous to the palate. The taste for it is an acquired and artificial one; but the great danger lies in the circumstance of this taste growing, so that an unhealthy craving for more arises, followed at last by a passion for drink for drink's sake, the lowest and most brutalising of tastes.

All drunkards at one time were sober persons; all drunkards passed through the stage of being moderate drinkers; but, as in running down a hill, an impetus was given which, they being neither brave nor strong enough to resist, carried them faster and faster along the downward course. Entire abstinence from alcohol would have been their salvation; moderate but ever-growing indulgence has proved their ruin; the descent is, alas! as smooth and treacherous as ice, and the headlong downward course once begun can be arrested only by more determination and greater strength than are the heritage of many men.

This vice of intemperance, which so rapidly leads its victims into the downward path of folly and perdition, clouds the intellect of its victims, and blunts their moral sense, making them capable of incredible folly and fiendish brutality. In fighting against this vice, the

first battle is the most important—resist the devil of intemperance, and he will flee from you.

Many able writers on this subject remark on the habit, so specially injurious to health, of **drinking spirits without eating.** The common practice of drinking as a sign of friendliness or good fellowship is a habit which requires checking. It is all the more dangerous on account of its association with business or friendly meetings. To refuse is a safe and wise step; to decline shows greater manliness than to accept. He who thus refuses an idle and unnecessary "drink" sets a good example to others, guards his body from a harmful practice, and increases his moral strength by exercising the virtue of self-denial.

CHAPTER II.

MORAL AND PHYSICAL EVILS OF INTEMPERANCE.

The evil results of intemperance in alcoholic drink are far from being merely matter of conjecture or limited personal observation. From all sides comes positive testimony on the subject, consisting of the public utterances of men in the highest and most responsible positions, of authoritative statements in official books and documents by men who are not themselves advocates of total abstinence, and of expressed opinions of many distinguished men; though, even if this testimony were wholly absent, our private observation would supply evidence enough of the evils of alcoholic excess, to say nothing of visits to abodes of vice

and misery, which afford such painful illustration of the wickedness and waste of substance which spring directly from slavery to drink.

In the Bible we find mention of the evils of drink, and the earliest reference to a class of abstainers. The Nazarites are spoken of nearly thirty-four centuries ago as abstaining under vows from wine; and eight centuries later we read of the descendants of Rechab who religiously pledged themselves to abstain from strong drink. From these ancient abstainers the teetotal society of the Rechabites has adopted its name.

Though wine-drinking races sin less against the virtue of temperance than those which drink spirits, yet drunkenness is, of course, not unknown among them, and we may believe that it was the visible evils of this that called forth the scathing condemnation of the wisest of men. These are Solomon's words: — "Who hath woe? who hath sorrow? who hath contentions? who hath wounds without cause? who hath redness of eyes? They that tarry long at the wine; they that go to seek mixed wine."

"Look not thou upon the wine when it is red, when it giveth his colour in the cup, when it moveth itself aright. At the last it biteth like a serpent, and stingeth like an adder."

Saint Augustine, of Hippo, who wrote the celebrated "Confessions," declared, fifteen centuries ago, wine-drinking to be "the mother of all mischief, the root of crimes, the spring of vices."

Truly the vice of drinking has never stood still, and the student of history will find evidence of it in every age. Towards the close of the seventeenth century, how-

ever, a most disastrous and demoralising taste for spirits set in. Legislation, as in the *Gin Act* of 1736, and other measures, sought to arrest the evil, but vicious indulgence in drink continued with little check down to recent times, the eighteenth century showing a repulsive amount of drunkenness; and though, in our present nineteenth century, the evil is a huge and alarming one, we can at least say that it is being lessened. The habit of getting drunk at dinner parties, so common once, and so freely excused, would now be nowhere tolerated; the offenders would properly become social outcasts. The disgraceful character of drunkenness is now fully acknowledged, while powerful and organised effort is made to check its progress. The necessity of such effort is urged by men of the highest distinction and the noblest character, and it seems fitting that some of these should be quoted. Thus, Mr. Justice Keating says—"Some of the saddest cases we have to deal with are those in which men go into public houses respectable and respected, and come out criminals;" and to this the Lord Chief Justice adds —"But for drink we might shut up nine out of ten of our gaols." * Baron Huddleston declared that nineteen-twentieths of the crime that came before him was connected with drink. The testimony of these eminent English judges is so weighty, and their opportunities of knowledge and observation so great, that we may select more of their expressed opinions for quotation. Mr. Justice Hawkins' words are—"If the cases appearing in all the calendars in England were taken, it would be

* This and some other similar testimony given here are quoted from Hird's "Temperance Reader."

found that 75 per cent. of the crime was traceable, directly or indirectly, to the inordinate love of liquor." Judge Patterson, at Norwich, in his address to the grand jury, said—"But for this drink, you and I should have nothing to do." In 1878, Mr. Justice Denham stated that—" . . . . On one occasion, in a northern county, he sat to try a calendar of 63 prisoners, out of whom 36 were charged with offences of violence, from murder downwards—there being no less than six murderers among these 36. In every single case, not indirectly but directly, these offences were attributable to excessive drinking." Mr. Justice Mellor said—"He thought he might state with some authority, after fifteen years' experience as a judge, that most of the crimes of violence proceeded either directly or indirectly from drunkenness." Mr. Justice Fitzgerald spoke of "the crying and besetting crime of intemperance—a crime leading to nearly all other crimes." Lord Coleridge, Lord Chief Justice of England, remarks—"I can keep no terms with a vice that fills our gaols, that destroys the comfort of homes and the peace of families, and debases and brutalises the people of these islands."

The expressed opinion of these eminent men derives indirect confirmation from statistics given in Whitaker's Almanac for 1892. In 1889–90 the number of convictions under "summary proceedings" was 605,921, and of these 189,746 were cases of drunkenness, an increase of 15,435 over the preceding year; but in addition to this there were 79,509 convictions for assault. Now, knowing the quarrelsome nature of tipsy men, and judging by the everyday experience of common disturbances, we may fairly

infer that the major part of these 79,509 offences arose also from drunkenness.

It is well known that indulgence in strong drink, while always injuring the brain, frequently becomes the cause of insanity. The following returns throw some light upon this question. Thus, of 1892 persons admitted into lunatic asylums during the three years, 1886–88, 238 cases are returned as directly due to drink; but 658 other cases are returned as from unknown causes; and it is believed that a considerable portion of these would, on inquiry, be found to be also the result of alcoholic intemperance.

Dr. Richardson, who has most exhaustively studied the subject, says that "in our asylums it has been found that 40 out of every 100 persons who were admitted insane had become insane, directly or indirectly, from the effects of strong drink."

About forty years ago Dr. W. B. Carpenter wrote a prize essay on the "Use and Abuse of Alcoholic Liquors." In this work are given some curious facts bearing on the matter of temperance in the Indian army. Thus, the case of the 84th regiment is quoted, a regiment of marked sobriety, which during the year 1846–47 lost by death only 13 men out of 1072, or the unusually low percentage of 1·21; while about the same time the 63rd regiment, at the same place, lost by death 7·88 per cent. of its strength, the average for the Madras station being 3·02.

Some curious results also appear in the following table, given by Dr. Carpenter, showing the mortality of the Indian army in each presidency:—

PERCENTAGE OF MORTALITY.

	Presidency.		
	Bengal.	Bombay.	Madras.
Native troops ...	1·790	1·291	2·095
European troops ...	7·380	5·071	3·846

Here, strangely enough, the mortality of the European troops is great where that of the native soldiery is small, and *vice-versâ;* but the explanation given was that the Bengal and Bombay native armies consisted chiefly (about three-fourths) of high-caste Hindoos, eating no meat or fish, and drinking no alcoholic liquor; while the Madras army was composed chiefly of low-caste Hindoos and Mussulmans, who are without the same prejudices in respect of food and drink. The explanation offered as to the excessive mortality of the European troops was to this effect: The Bengal army received in the ration allowance no other beverage than rum; the Bombay soldiers received rum and a little porter; while to the Madras army porter, but no spirits, were issued. It thus appeared that the mortality was in direct proportion to the amount of spirits issued.

Dr. Carpenter gives another instructive statement, which should be quoted with reference to the effect of temperance in soldiers on foreign service. Out of nearly 27,000 Anglo-Indian troops in the Madras presidency, a considerable proportion were members of temperance societies—not total abstainers but persons pledged to avoid spirits.

The returns below, which give the daily percentage of men in hospital, are significant, showing in a marked degree the better health enjoyed by temperance men :—

DAILY PERCENTAGE OF MEN IN HOSPITAL.

From 9340 temperance men	3·65
From 17,354 rest of the army	10·20

Some further returns from troops serving in various British regiments in India are given for a later date :—

ARMY RESULTS

Among 3978 Abstainers and 8829 Non-abstainers in various regiments of the Indian army in 1885–6.

	Admission to Hospital.	Percentage.	Invalided.		Deaths per thousand.
			To the hills.	To England.	
Non-abstainers	8,887	100·6	3·82%	2·93%	9·5
Abstainers ...	1,812	45·5	1·88%	·603%	2·7

From this table it appears that, compared with the total abstainers, three and a half times as many non-abstainers died; more than twice as many were ill in hospital; and nearly two and three quarters as many were so broken down in health as to be invalided.

Lord Wolseley, one of the foremost generals of this century, has written a famous military compendium known as the *Soldier's Pocket Book*. The experience of this distinguished soldier is valuable and suggestive. He says: —"The old superstition that 'grog' is a good thing for men before, during, or after a march, has been proved by

the scientific men of all nations to be a fallacy, and is only still maintained by men who mistake the cravings arising solely from habit for the promptings of nature herself. It is the commonest thing to see men, even when travelling at home, taking brandy 'to keep themselves warm.' It is an ascertained fact that alcohol of any sort reduces instead of increases the temperature of the body. The use of spirits in cold weather has been well tested during the various polar expeditions, the medical officers of which all condemn it as a preventive against cold. No men require greater endurance than the trappers of British North America, and none do a greater amount of hard physical work than the voyageurs and lumbermen there; none of them drink spirits when in the woods, tea being their constant beverage. Our armies in Kaffraria had no spirits issued to them as a rule, and no army in the field was ever more healthy (if any other even was as free from sickness). Our experience in the Indian mutiny also carries out this theory; for months in some places our men were entirely cut off from all liquor, and they were healthier than when subsequently it was issued to them as a ration. By increasing the allowance of tea, and abolishing that of rum, you diminish the supplies to be carried to a great extent, whilst you add to the health and efficiency of your men; their discipline will improve as their moral tone is raised, engendering a manly cheerfulness that spirit-drinking armies know nothing of. No men have ever done harder work than was performed by the troops employed upon the Red River Expedition; no spirits of any sort were issued to them, but they had practically as much of good tea as they could drink;

illness was, I may say, unknown amongst them. No spirit ration was issued to the troops on the Nile during the recent Soudan campaign, and no men could have had harder work than those who reached Korti in boats."

To this statement, military testimony may be added from another eminent soldier, Lord Napier of Magdala: —"On reviewing the record of soldiers' offences," says Lord Napier, "all practically have their origin in drunkenness. Of 18,000 men under my command in India, the total abstainers had no crimes. The temperance men had practically none. The whole body of crime was among the non-abstainers."

It is natural to suppose that the lives of temperate people should be happier and healthier than those of people who exhibit less of the virtue of self-restraint; yet few people would guess the extent to which life is lengthened by temperance, and some very interesting evidence on this point is available. In the year 1840 an insurance company, the United Kingdom Provident Institution, was founded. This society, believing in the great longevity of teetotallers, established two classes of insurers: the temperance list, consisting of total abstainers, and the general list, which includes all other persons. This company has kept separate the returns of these two classes, the result being, as the following table will show, a startling illustration of the benefits of temperance:—

LIFE ASSURANCE RESULTS.

United Kingdom Temperance and General Provident Institution.

Twenty-five Years.	Temperance Section.		Per-centage.	General Section.		Percentage.
	Expected Deaths.	Actual Deaths.		Expected Deaths.	Actual Deaths.	
1866–90.	4,856	3,423	72	7,277	7,034	97 nearly

Too much stress cannot be laid on the fact that out of every 100 expected deaths, nearly 97 per cent. actually occurred among the non-abstainers, while of every 100 deaths expected among the total abstainers, only 72 really took place, 25 lives in every hundred of these being saved more than in the case of their non-abstaining brethren.

The same testimony is borne by a similar society established in Melbourne, as will become evident from the figures following:—

Australasian Temperance and General Mutual Life Assurance Society.

Section.	Number of Policies to September, 1890.	Deaths during the five years.	Deaths per thousand in five years.
Temperance	2,957	42	14·2
General	1,205	33	27·4

Further statements on this particular subject are now given in the form of returns from Victorian friendly societies to show the superior longevity of those who possess the moral discipline and self-restraint required to

avoid the evils of intoxicating drink. The tables are meant to illustrate the close connection that exists between temperance and longevity.

RELATIVE MORTALITY.—VICTORIAN FRIENDLY SOCIETIES.—
1ST QUINQUENNIAL INVESTIGATION.
Figures received, 7th June, 1887.

	Mean No. Members at Risk during Quinquennium.	No. of Deaths per annum. Quinquennial Mean.		Rate of Mortality Expected, Rate being taken as 100.
		Actual.	Expected.	
Independent Order of Rechabites and Sons of Temperance (two temperance societies) ...	7,384	49	74	66
All other Societies	38,353	426	443	96
All Societies (Grand Total) ...	45,737	475	517	91

RELATIVE MORTALITY.—VICTORIAN FRIENDLY SOCIETIES—*continued.*
2ND QUINQUENNIAL INVESTIGATION.
Figures received, 26th May, 1891.
Supplied by Mr. Owen, Actuary of the Friendly Societies of Victoria.

	Mean No. Members at Risk during Quinquennium.	No. of Deaths per annum. Quinquennial Mean.		Rate of Mortality Expected, Rate being taken as 100.
		Actual.	Expected.	
Independent Order of Rechabites and Sons of Temperance (two temperance societies) ...	8,315·8	63	88	71
All other Societies	49,698·3	544	583	93
All Societies (Grand Total) ...	58,014·1	607	671	90

Before closing this part of the subject it should be added, with reference to the rates of mortality prevailing for persons of different occupations, that while the mortality of ministers of religion, farmers, and graziers is little more than half the average rate, that of publicans and hotel servants is excessive, being nearly double that rate.

All these statistics tend so plainly to confirm belief in the longevity of teetotallers, that comment on them would be almost a waste of words.

CHAPTER III.

WHAT INTEMPERANCE COSTS.

FEW persons who made no inquiry into the matter would imagine how vast a sum of money is lavished on intoxicating liquors; yet how common a thing it is for men to spend for this purpose a large part of their earnings. Take, for example, a man earning twenty-four shillings weekly, and suppose him to indulge daily in three or four twopenny drinks, with extra ones during the week, costing in all four shillings. Such a man would not be deemed intemperate, and would certainly not get drunk; yet, how great to him would be the comparative cost! Four shillings weekly would be one-sixth of his whole income—£10, 8s. in the year—a sum that, if paid down at the age of 25, and continued annually, would insure his life for £500, or that would pay his rent, or that would pay for two-thirds of his furniture, or that at least would place to his credit in the savings-bank a sum that might be of the greatest service for the proverbial rainy

day—a sum that would help him to tide over seasons of hardship and lack of employment without distress or without loss of independence and self-respect. Beginning thus in life at the age of 20, the abstainer might at the age of 50 be £312 richer than the non-abstainer, merely through saving four shillings a week; and to this £312 must of course be added the interest which would accrue through all those years—making at 4 per cent. a total saving of £615.

But if this be the case with a so-called temperate man, how must it be with one who is truly intemperate, and who spends on drink a large part of his earnings? The substance he so meanly and selfishly squanders to satisfy a low personal craving represents not only so much money lost, but shows cruelty and unmanliness in taking away comforts or necessaries from wife, children, or relations; then there is loss in self-respect, in physical health, and in capacity for work, to say nothing of money thrown away that might have helped him to rise in life, or even to lay the foundation of an honourable independence. Besides all this, there is the serious consideration that such excess stops not at the waste of money—it prevents a man from earning any, for he becomes a sottish, debased, untrustworthy person, whom nobody will employ. Thus not the lightest cost of this heavy charge lies in the fact that employment is lost and sacrificed, and the means of earning a livelihood destroyed. Who is willing to employ a drunkard?

We have seen that, even for only a single family, the cost of alcoholic drink may amount in one year to very many pounds; but when the total for a whole nation is so

taken, the amount spent becomes amazing, as will be seen in the following statement, which shows the total cost of alcoholic liquors consumed in the United Kingdom for the past twenty years:—

"THE UNITED KINGDOM DRINK BILL FOR 1889.

[BY THE REV. DAWSON BURNS, D.D.]

"The official returns just published enable us to calculate the drink bill of the United Kingdom for 1889, and to compare it with the similar bill for 1888.

Liquors consumed.	Quantities consumed in 1889.	Expenditure in 1889.	Expenditure in 1888.
	Gallons.		
British spirits, at 20s. per gallon	27,183,351	£27,183,351	£25,963,593
Foreign and Colonial spirits, at 24s. per gallon ...	8,552,310	10,262,772	9,741,040
Beer, 1s. 6d. per gallon ...	1,073,655,828	80,524,187	75,260,615
Wine, 18s. per gallon ...	14,158,851	12,742,966	12,150,098
British wines, cider, &c. (estimated)	15,000,000	1,500,000	1,500,000
		£132,213,276	£124,615,346

"Estimating the population at 37,808,892, it appears that the expenditure on strong drink per head last year was £3, 9s. 11d., and per family of five persons £17, 9s. 7d., as compared with £3, 6s. 8d. per head and £16, 13s. 4d. per family in 1888. The gross increase in the national drink expenditure was £7,597,930. This increase may be referred to the revival of trade, and the superior spending power of the people. As regards the kinds of intoxicating liquor, the augmented expenditure was

thus distributed—on British spirits, £1,219,758, and on foreign and colonial spirits, £521,732, a total on ardent spirits of £1,741,490; on beer, £5,263,572; on wine, £592,868, a total of £7,597,930. As the bulk of the increase was on beer and British spirits, it is to be feared that the additional expenditure came largely out of the pockets of the working classes; and as no one has ever hinted that they, or any other class, have been spending too little upon intoxicating liquors, it may be taken for granted by universal consent that the seven millions and a half added last year to the national drink bill was money that might have been well saved from indulgence in strong drink, and applied to much better purposes.

"Lamentable, however, as is this evidence of the tendency of improved trade and larger earnings to swell the national drink bill to greater inordinate proportions, a comparison of the expenditure in the two decades respectively ending 1879 and 1889 will show that the second decade has drunk less than the one just before it.

First Decade.		Second Decade.	
1870	£118,736,279	1880	£122,279,275
1871	125,586,902	1881	127,074,460
1872	131,601,490	1882	126,251,359
1873	140,014,712	1883	125,477,275
1874	141,342,997	1884	126,349,256
1875	142,876,669	1885	123,268,806
1876	147,288,759	1886	122,905,785
1877	142,007,231	1887	124,953,680
1878	142,188,900	1888	124,615,346
1879	128,143,865	1889	132,213,276
Total ...	£1,359,787,800	Total ...	£1,255,388,518
Annual average ...	£135,978,789	Annual average ...	£125,538,851

"Reverting to the drink bill for 1889, it cannot but be regretted on social and moral grounds that so vast an expenditure should have respect to articles which are at best a luxury, and which lead, by what is often called their 'abuse,' but by what I prefer to describe as their power of abusing mankind, to the greatest evils which can afflict humanity.

. . . . . .

"More than a generation has passed since statesmen and the Press joined to declare that something should be done to abate what was then considered the excessive consumption of intoxicating liquors; and the *Times,* in one of several vigorous articles, asserted that it was desirable that the publicans' profits should be reduced one-half. . . .

"If this state of things is not to continue, what remedies can be applied? I would suggest two—improved education and advanced legislation. By 'education' I do not mean the general instruction given in schools and colleges, but that education which would enlighten the people upon the properties and effects of alcoholic liquors—a species of education which seems to be very defective among persons of higher general education. If intoxicating liquors were not confounded, as to their nature, with articles of a useful or innocent composition, at least two-thirds of the current objections to total abstinence would disappear; and it is, therefore, of vital importance that the young at least should be trained in the knowledge that will preserve them from the errors into which so many of their elders have fallen."

Statistics tell of the actual sums expended on strong

drink; but they afford no direct information of the fearful **waste caused thereby in other ways.** For example, they do not show the loss arising through waste of time, labour, and energy; the loss through impaired health and premature death; the loss owing to careless destruction of property; neither do they show the increased burdens of poverty, crime, and lunacy, of which drunkenness makes the load so heavy; nor do they indicate the extra charge of prisons, asylums, gaolers, warders, police, judges, &c., caused by these evils. But that these indirect losses are enormous must be evident on a moment's reflection; and certain remarks of Sir Joseph Whitworth, M.P., are here quoted, as bearing forcibly on one single aspect of this matter. Sir Joseph was the owner of great iron and steel works, and was well known on account of his cannon, which were then deemed rivals of the famous Armstrong guns. This gentleman said:—"In one concern with which I am connected, Sunday drinking causes a loss of £35,000 per annum. It does it in this way—We find from experience that the men will not come to work on the Monday morning in sufficient numbers to make it worth our while to put the machinery in motion. Even if they do, they are unfit to work, and we find it such ineffective labour that we do not start until the Tuesday. The result is, as I say, a loss of £35,000 upon that one concern alone."

It is desirable that we should be clear as to the important fact that money expended on strong drink is spent unproductively, very often harmfully; and that, if men were to avoid such expenditure, they would be better off in mind and body.

Remarkable illustrations of the fact that **people become prosperous when they waste no money in drink** are afforded, strangely enough, by the experience of years of famine when distillation was prohibited by law in order to prevent the consumption of grain otherwise than for food. Distillation from grain was, in fact, prohibited in Great Britain from March, 1757, till December, 1759; and the consumption of spirits in England and Wales fell enormously. In 1742, the consumption had been 19,000,000 gallons; from the years 1760 to 1782 it averaged only 4,000,000. At certain intervals during the reigns of George II. and George III. the scarcity of corn gave rise to legislative enactments, prohibiting, sometimes for several years, the distillation of grain. The result was thus testified to by Smollett:—"The common people had become apparently more sober, decent, healthy, and industrious, while the good and salutary effects of the prohibition were visible in every part of the kingdom."

During the famine year of 1796, the distilleries were stopped, and Mr. Colquhoun, who wrote a "Treatise on the Poor of London," shortly after (1800), gives this evidence as to the remarkable state of things that followed the prohibition of distillation:—"It is a curious and important fact that during the period when the distilleries were stopped, in 1796–97, though bread and every necessary of life were considerably higher than during the preceding year, the poor were apparently more comfortable, paid their rents more regularly, and were better fed than at any period for some years before, even though they had not the benefit of the extensive

charities which were distributed in 1795. This can only be accounted for by their being denied the indulgence of *gin*, which had become difficult to obtain on account of its very high price.

"It may be fairly concluded that the money formerly spent in this imprudent manner, had been applied in the purchase of provisions, and other necessaries, to the amount of some £100,000. The effect of their being deprived of this baneful liquor was also evident in their more orderly conduct; quarrels and assaults were less frequent, and so were visits to the pawnbroker's shop; and yet, during the chief part of this period, bread was 1s. 3d. the quartern loaf."

Regarding Ireland, similar statements are made. The years 1809, 1810, 1813, and 1814 were seasons of great dearth; and in order to lessen the scarcity of food, the working of distilleries was stopped for those years. Strange to say that though 1811, 1812, and 1815 to 1817 were years of plenty, but with the distilleries at work, the prosperity of the country was far greater in the famine years; while at the same time, crime, disease, and pauperism were all lessened. Is the inference unfair that the closing of the distilleries during the famine were factors in producing these remarkable and unexpected results? Official statistics regarding this matter were presented to Parliament and are copied here :—

TABLE OF IMPORTS,

Extracted and averaged from returns made to Parliament in 1822. (See the Fourth and Fifth Reports of Commissioners of Inquiry.)

Famine Years, with Distillation Stopped, 1809–10; 1813–14.			Years of Plenty, with Distillation Allowed—1811–12; 1815–17.	
				Decrease.
Haberdashery	£140,396	Value	£110,936	£30,000
Iron, Hardware, and Pots	£467,109	Value	£337,458	£129,651
Cotton Goods	£197,198	Value	£104,198	£93,000
Black Tea	3,530,643	Lbs.	3,189,132	341,511
Muscovadys Sugar ...	381,278	Cwts.	306,954	74,324

Too much stress cannot be laid on the fact that the people's prosperity was greater in the famine years with the distilleries closed, than during the years of plenty with them at work. The lessons to be drawn are of the simplest kind, though none the less valuable. If money is not spent on expensive drink, it becomes available for comforts, for culture, for industrial enterprise. The Rev. J. Dennis Hird, in his "Temperance Reader," gives other cases worthy of notice. One is the town of Bessbrook, in Ireland, with 3000 inhabitants—a town without a public-house—drunkenness does not exist there. Another is an estate in the county of Tyrone, with a population of 10,000 people, no intoxicating liquors are sold there. Lord Claude Hamilton, speaking in 1870 of this district, described it as greatly changed by temperance. Strife and disorder had disappeared, the poor rates had diminished by one-half, while police and magistrates testified to the absence of crime.

An inquiry, made in 1869 for the Convocation of the province of Canterbury, gave evidence also that in 1000

English parishes, where neither public-house nor beer-shop existed, "the intelligence, morality, and comfort of the people were such as the friends of temperance would have anticipated."

In considering the foregoing statements as to the immense sums expended on alcohol, so much of it needlessly, so much of it harmfully spent, we must not overstate the position. If all this particular outlay were to cease, we could not say this huge amount would be directly saved; for if people drank no intoxicants they would probably eat more (not usually a bad sign), and most certainly they would consume greater quantities of tea, coffee, &c.—nobody will rest wholly satisfied with simple water; so that, while there would be an immense saving in the amount spent on intoxicants, there would be a large augmentation in the amount spent on non-intoxicants; while, further, it may be urged that, if digestion is spoilt by over-indulgence in alcoholic beverages, it may also be ruined by excessive tea-drinking. In reply to this, it may be said that non-intoxicating drinks do not lead people on to undue indulgence in them. It would be difficult to imagine as close a connection between tea and crime as exists between alcohol and crime. No excessive drinker of tea becomes thereby stupefied or brutalised; the love of tea does not make him degraded or violent—he never develops through tea-drinking into a selfish ruffian, nor does he acquire such a morbid craving for more tea as would cause him to rob his children, to starve his wife, and to neglect the most necessary duties of his condition. The waste of intemperance consists less in the amount spent on strong drink, though that is

enormous and shameful; it lies rather in the accompaniments of excess, which are only too evident, and which are a lowered morale, a weakened physique, and a blunted or destroyed capacity for work.

With a view to lessening the evils of intemperate drinking, **public-houses** are placed under the supervision of the police. The right of opening them or carrying them on is restricted to persons who pay a licence-fee for the privilege, and who are reported to be of good character; but, as it is always too easy for intemperate people to obtain strong drink, various measures have been proposed to stand in the way of their vice. Thus some advocates are found for the plan adopted at Gothenburg, in Sweden, by which the right to sell strong liquor is restricted to officers of the municipality, who are paid fixed salaries, and have therefore no personal interest in allowing persons to lavish their money on drink. Another important plan is that called Local Option, whereby it is proposed to empower a majority of the electors of a district to close all the public-houses in it; while a third plan aims simply at giving to the ratepayers power to control and limit the number of public-houses within their district. Restriction of some kind seems to all an admitted necessity, on account of the manifold social evils that are begotten by the vice of excessive drinking. Intemperance of this kind is the prolific parent of a whole family of sins, nay, it is the parent of the very worst.

Seeing that so widespread an evil has much engaged the thoughts of statesmen and philanthropists, we have culled some of their utterances where they have sought to cast a dart at this terrible enemy; but one or two

more extracts have yet to be given. Thus Mr. Joseph Chamberlain, M.P., expresses himself in the following uncompromising terms:—"If I had an enchanter's wand, and could destroy to-morrow the desire for strong drink in the people of England, what changes should we see? We should see our taxation reduced by millions sterling a year; we should see our gaols and workhouses empty; we should see more lives saved in twelve months than are consumed in a century of bitter savage war. We should transfigure and transform the whole face of the country."

It has been asserted that the **low mortality of prisoners**, about eight per thousand, or little more than a third of that of the ordinary population, is entirely attributable to their enforced abstinence and regular habits; but it would seem that this statement requires some modification. In gaols, there are rarely very young children or very aged adults; moreover, prisoners who are known to be hopelessly ill are if possible liberated to die amongst their friends; but when due allowance for all this has been made, seeing that the criminal classes are persons of depraved habits, and physically inferior to the rest of the community, it is noteworthy that their mortality should be actually as low as it is. The reason of enforced abstinence and regular habits is therefore a good one, as far as a lower or even an equal rate of mortality obtains among prisoners.

Sir Andrew Clark, the eminent physician, asserts that in his hospital wards seven patients out of every ten owe their ill-health to alcohol; and Dr. Norman Kerr, who had disbelieved a statement that alcohol kills yearly in

the United Kingdom 60,000 victims, having set himself to study the question, came to the conclusion that it was not only true, but terribly understated ; and at a Social Science Congress, he publicly declared, as the result of his investigation, that the **annual deaths** caused by strong drink amount to 120,000 ! Dr. B. W. Richardson, maintains, however, that even this sad array of figures is far too low. He insists that **nearly 200,000 lives are yearly sacrificed** to alcohol in the United Kingdom alone.

Here may be fitly quoted the wise question put by the late Cardinal Manning in the *Fortnightly Review*, in 1886, in an article called "Our National Vice." In earnest forcible words the cardinal asks questions that probe down to the quick of this matter; and with his searching questions this branch of our work may end. His Eminence says—"Our nation has a multitude of vices. Is there any vice that cannot be charged against us? But is there one vice that is head and shoulders above all others? Is there one that by its stature and its sway dominates over all around it? To answer this, let us ask—

"(1) Is there any vice in the United Kingdom that slays at least 60,000, or, as others believe and affirm, 120,000, every year ?

"(2) Or that lays the seeds of a whole harvest of diseases of the most fatal kind, and renders all other lighter diseases more acute, and perhaps even fatal in the end ?

"(3) Or that causes at least one-third of all the madness confined in our asylums ?

"(4) Or that prompts, directly or indirectly, 75 per cent. of all crime?

"(5) Or that produces an unseen and secret world of all kinds of moral evil, and of personal degradation, which no police court ever knows, and no human eye can ever reach?

"(6) Or that, in the midst of our immense and multiplying wealth, produces not poverty, which is honourable, but pauperism, which is a degradation to a civilised people?

. . . . . .

"(7) Or that has destroyed, and is destroying, the native races wheresoever the British Empire is in contact with them; so that from the hem of its garment there goes out, not the virtue of civilisation and of Christianity, but of degradation and of death? . . ."

There is only one reply to this:—It is the abominable and brutalising vice of drunkenness.

FROM GOUGH'S ORATIONS.

I.

THE TEMPERANCE STANDPOINT.

In the short space of time allotted to an evening's address I must be confined very much to one or two points, and I wish more emphatically and more particularly to define my position. Every individual is ready to agree with me that drunkenness is an evil, and that it is our duty to do all we can to remove that evil. Now, on these two points we are all agreed, and on these two facts we base our whole operations; and the difference between you and me is not with regard to the evil, but with regard to the method of removing it. Now we want to proclaim our method. Believing that the use of intoxicating liquor as a beverage is not only needless, but hurtful to the social, civil, and religious interests of the community; and that, while men continue to use it as a beverage, the evils of drunkenness will never be done away—believing this, we agree together that we will not use it, traffic in it, or provide it for others, and that we will in all suitable ways discountenance its use throughout the community. We thus stand in an attitude of antagonism to the use of intoxicating liquor as a beverage, whether at the sideboard

of the wealthy, in the social circle, or in your dram shops —advocating, maintaining, and defending the principle of total abstinence from intoxicating beverages as a lawful principle, a sensible principle, and one which, if universally adopted, would roll back the tide of drunkenness from this land for ever. Then TOTAL ABSTINENCE is our theme. Our principle of total abstinence is a lawful principle. We are not waging war against alcohol as a medicine—although I do not believe in it as such, and I would not take it.

A gentleman said to me, "The Bible is against you."

"Oh, no," I replied.

"Well, you have no command in the Bible to abstain."

"Don't want one." I do not go to the Bible to find a command, "Thou shalt abstain from intoxicating liquors." I do not go to the Bible to find a command, "Thou shalt abstain from gambling, horse-racing, prize-fighting, dog-fighting, cock-fighting, and all that sort of thing." As a Christian man, I abstain from these things, believing them to be detrimental to the best interests of society; and because I am a Christian it is not only lawful for me to do so, but an absolute duty. I give to these men all they claim.

Well, the Bible permits the use of wine,—yes. Approves it,—yes. Our Saviour made wine,—yes. He drank wine,—yes. It is lawful to drink wine,—yes. What more do you want? The Bible permits, sanctions, and approves it; the Saviour made it, and it is lawful to use it. I will give you all that; but I want to say, in defining my position, that every man who brings the Bible to sustain him in the use of drink, must accept the

Bible as a rule of faith and practice; or it is mean, it is sneaking, it is cowardly and contemptible—to search the Bible for permission to gratify a propensity, and then reject all God's other requirements. When I speak of the Bible argument, I speak of it to Bible believers and Bible lovers. I give them all they ask, and now I define my position in reply. With my views of Christianity and its claims upon me, by my allegiance to God, by my faith in Christ, by the vows I took upon myself in His presence and before His people, I am bound to give up a lawful gratification, if by my giving up that which is lawful to me I can stand between a weaker brother, and by my example save him from falling into ruin. Can you take that away from me? That is my position, and I will hold it, and I will take my stand upon it in the Day of Judgment.

Our principle of total abstinence is a lawful principle. It is a sensible principle. Can you find me a man sixty years old who will say—"I am sixty years of age, and I never drank a drop of intoxicating liquor, but I regret that I did not learn to drink it when I was a young man?" Find me such a man in London! Find me such a man anywhere! When I was in California a gentleman, who was attached to the theatre there, called upon me. Now, I am not a theatre goer, but I am acquainted with a great number of those who are engaged as theatrical performers: some of them are good men, and for aught I know some of them are Christian men. Well, this gentleman said, "I am no reformer. It is not in my line. Sunday-schools and temperance societies are all very well in their way: but they are not in my line. I have been an actor since I

was eighteen years of age, and I am now forty-two; and I never drank a drop of intoxicating liquor in my life. What do you think of that? I am proud of it myself." He was not a temperance lecturer. He cared but little for the abstract principle; but as to the fact of his own total abstinence, he said, "I am proud of it."

Look at the wrecks of men to be seen on every hand. Oh, young men, I wish I could lift the curtain that conceals from your view the secrets of this charnel-house of intemperance. A man about forty years of age, I suppose, a graduate of Edinburgh University, came to me and showed me his diploma as a physician. He was quite a fluent linguist and a very cultivated gentleman; but *the mark was upon him.* I was with him some time, and when he left he said to me, "I am very much obliged to you, Mr. Gough, for your kindness to me. You have told me the truth, but it's no use. There's no hope for me. Will you shake hands with me? I'm a lost laddie—good-bye."

Lost! lost! lost! And there are men who are becoming lost to-day—going across that line—the which, if they cross it, leaves them but little hope. It is horrible to note the results of this drinking system, and yet observe men stepping forward to fill up the ranks as death mows others down. It is fearful, it is pitiful.

Then what shall we do? Our principle of TOTAL ABSTINENCE is a simple method. It is *so* simple. What we want is that men and women should adopt it. I should like to say something in reference to this, but as I am to speak again I want to save something, as men often do,

"for another occasion." I want to take different ground in my next speech to the people of London. But as regards total abstinence, I think I have defined our position—IT IS LAWFUL; and IT IS EXPEDIENT, when we do it for the sake of others. And now I want to ask you a question. If a principle is worth adopting for the sake of example, is it not worth adopting *for its own sake?* If you adopt a principle as an example to save others, is not the principle worth your adoption for its own sake?

We ask you, however, to adopt this principle, not only for your own sake, but for others. Oh, these men need help. They know that the craving appetite is like the smouldering fire of a volcano within, ready to be roused by the first dram. Do not tamper with the appetite. Do not think, if you have abstained for years, that you can drink a little moderately. I remember reading of a gentleman who had a pet tiger. The tiger was in his study one day, and the gentleman's hand was hanging over the chair. The tiger was licking his hand, and on the gentleman attempting to remove it, the animal, with a low growl and a snarl, fixed its claws in the gentleman's arm. The tiger stood with his ears thrown back, his eyes green, waving his tail. There was danger! The gentleman, keeping his eyes fixed upon the tiger, rang the bell and ordered the servant to bring his pistol, with which he shot the tiger dead. He then looked at his hand and observed blood upon it! the taste had aroused the tiger's dormant nature. So is it with the appetite for drink, which is ever ready, like the tiger, to make the fatal spring whenever it is for a moment tampered with.

You remember when the children of Israel went out of Egypt they were a band of escaped fugitives. Their ranks were encumbered with the presence of many women and children, and their mighty but meek leader was armed only with a rod. Here come the chariots and the horsemen of Pharaoh treading on their very shadow. A pillar of fire went before them at night, and a pillar of cloud by day, and they marched till they came to the shores of the Red Sea, and then—what? Read the magnificent narrative. "And the Lord God said unto Moses from out of the cloud, 'Speak to the children of Israel that they go forward.'" That was the only command. How can they go forward? There is no other command for the children of Israel; but to Moses there came the words, "Stretch forth thy rod," and the way opened. God never gave us a duty to do yet but He opened the way for us when we were ready to do it. He never gave an impossible command yet. So the waters stood in heaps. Tramp, tramp, tramp—went the three millions through the bed of the sea, and their enemies came in after them, and it was in the night time. Now . . . what? "Forward!" "But our enemies are in our rear." "*Forward!*" "Yes, but before us is we know not what. The waters are on either side." "FORWARD!" "Yes, but we can feel the very breath of the horses upon our necks, and hear the chariot wheels grind in the shingle as they pursue us." "FORWARD!" "Yes, but we must defend our wives and little ones." "FORWARD!" And the pillar that went before them passed over and stood in their rear. It was light unto them; it was darkness to their enemies: "and they came not near each other all the night." Those who had

obeyed the command, "Forward!" stood on the other side, and then "the Lord God looked out from the pillar of fire, and troubled the Egyptians, and brake their chariot wheels." Those who had obeyed the command, "Forward!" saw the wrecks of chariots and the carcasses of the horses and the bodies of men strewing the strand.

Brethren, settle the matter: "Am I right?"—and then FORWARD all with a hope and a prayer, "God speed the right, and use us as instruments in His hands for that grand and glorious purpose."

II.

THE POWER OF HABIT.

I AM to speak to you on the subject of Temperance—the same theme upon which I spoke so many years ago. Nothing new can be said upon the subject. We advocate the principle of TOTAL ABSTINENCE. I intend to say a few words to-night in reference to the practical working of that principle. There are those who tell us that all who drink do not become drunkards. We know that; and I am not dunce enough to stand before an audience and declare that a moderate drinker is worse than a drunkard, or any such trash as that. We know better. I am not here to say that if a man drinks intoxicating liquors he must become a drunkard. We know better than that. There are men who can drink moderately. A lady said to me, "I thought you were going to be intolerant, and I am surprised that you give so much to

your opponents." Why, I want to give them all they ask—everything they ask. Mark, I do not assent to what they ask; but I give it them, and then define my own position. My object is not to show that they are wrong, but that I am right.

Now we know that there are moderate drinkers—respectable, moral, God-fearing, Christian moderate drinkers; and there are men who *can* be moderate drinkers. My father was a moderate drinker all his life. He would take his glass of ale for dinner, and his glass of ale for supper. Once in a while he would send me (I would not go to-day even for him), but he would send me when I was a boy, to buy, perhaps, fourpenny-worth of spirits, which he would put into hot water, and drink before he went to bed. Now, my father never was intoxicated—never was known to be so. He died at the age of ninety-four, in this city of London. My father could be a moderate drinker; his son could no more be a moderate drinker than you could blow up a powder-magazine moderately or fire off a gun a little at a time. Impossible! Then you say, "You are a weak-minded man." Very well. If I am so weak that I cannot drink moderately, thank God I am strong enough to let it alone!

But you say, "If a man cannot drink in moderation, he is a weak-minded man." Now, I want to say a few words to moderate drinkers, because they are the hardest cases we have to deal with. They have lost no reputation; they are not injured in health or property; their gloss of respectability is not dimmed; no apparent injury comes to them by the use of intoxicating liquor; and therefore they say, "Why should I sign

your total abstainer's pledge? I never drink enough to hurt me." And if we get them to sign our pledge, or adopt our principle, they must do it in a large-hearted spirit of self-denying benevolence—must do it for the sake of others; and that is the highest motive, in my opinion, that can move a man to do it.

What I want to say to the moderate drinker is this: You make one great mistake in setting up your example as a GOOD one, and *there* is your mistake. Now, I say to you: Drink if you will; drink if you must; drink till you die; but do not dare to tell young men around that you set them a good example by your drinking. I will not interfere with your drinking; drink as much as you like; but do not tell young men that in it you set them a good example. What is a good example? It is an example that young men can follow in safety. You say, "If young men do as I do," ah! *If* they do.

I remember once seeing in New York City a very beautiful spire to a new church, and just about ten feet from "the ball" a plank was pushed out, with ropes over the ends of the plank. The plank was let down, and the ropes were fastened inside of the window. There was a platform, perhaps five or six feet from this little window, and one hundred and fifty feet from the roadway. I saw a man get out of that window and stand on that little platform. Could you do it? How many of you could do it? He spoke to a man on the side-walk; the man called up to him, and he leant with his hand upon the end and replied to the man upon the pavement. Now, I know that if I had undertaken to stand on that plank, the very moment my foot touched it, and I saw the awful

depth beneath—ah! I should have gone down. There would have been no mind, no intellect, no genius, no will, no power on earth that could have saved me; I must have fallen—to have stood firm would to me have been physically impossible. Now, *you* might perhaps stand there; but suppose that in so standing you tell me you set me a good example. I say to you, "Stand there, if you like; I have no objection; you may stand there from now till to-morrow morning, or, like Simon Stylites, for thirty years; but do not tell me you set me a good example." Now, suppose you induced me to follow your example. You tell me it is safe—"Why, I stand here perfectly safe;" and you induce me to try and follow your example, and I fall: what then? Are not your skirts full of my blood? Can you get away from that? "It must needs be that offences come, but woe to that man by whom the offence cometh." If you stand there safe yourself, and induce me to stand there and I fall, what then? Why, you say I am "weak-minded." Well then, by God's help I will keep off the plank, that's all.

No man ever took a glass in his hand and spoke to it thus: [At this point Mr. Gough took up a glass, and held it in his hand as he spoke.]—"Here I stand in vigour and health, with fine physical development and high ambition. I have a wife who loves me in the core of her heart, children who cling to me with loving affection. I am respectable and respected. My ambition is high, my hopes are bright. Now, *with this* I will ruin my health; *with this* I will blast my prospects; *with this* I will stain my reputation; *with this* I will destroy my manliness; *with this* I will break my mother's

heart; *with this* I will bring disgrace on all who love me; and men shall sweep me away as with the pitiful leavings of a dram-shop, and in after-years shall speak of me with bated breath, for 'the memory of the wicked shall rot!' Now, I will take my first step to just such a consummation by taking MY FIRST GLASS." No man in his proper senses would speak like that. And yet men are *doing* these very things, doing them here, right under the shadow of this Hall—doing them everywhere—ay, and bringing woe and horror into their own souls and into their own families, greater than the mind of man can conceive.

But you say, "They are weak-minded." Now, it takes more mind, more strength of mind, more firmness of purpose, more decision of character, to break off a bad habit, than it does to acquire one. Some of you, perhaps, have acquired a habit—a little trifle, a small affair, hardly worth mentioning. See that young lady's fingers, marred and unsightly, stubbed, and unpleasant to look at. What is the matter with them. *She bites her nails.* It is a trifling habit; let her undertake to break it. I know a lady who strove for more than three months before she could break through such a habit. She would say, "When you see me put my fingers to my mouth, cry 'Fingers!'" and when her friends cried out, down went her hand. A moment after, and she would begin thinking, and set to biting away at her nails again.

A simple habit is hard to break. I knew a man who had acquired a habit of leaning with his hand upon a desk or table, and twisting his hair round his fingers,

while he was reading. I said to him, "You will pull your hair out." "Oh," said he, "I have acquired the habit of reading in this way, and I cannot read with comfort unless I am twisting my hair as you see."

A minister of the Gospel said to me, "I was once a sad drunkard, and I signed the pledge. Many times I had been in the ditch. When I became converted, I made up my mind I would study for the ministry. I was a student. I had no desire for the drink. I had an idea that my religion had driven all that out of me. The grace of God had taken away the appetite for, and the love of Jesus had taken away the love of drink. I thought myself perfectly safe. I was invited out to dinner. If the gentleman had asked me to take a glass of wine, it would have been 'No,' or a glass of ale, 'No;' but he gave me some rich English plum-pudding, pretty well saturated with brandy, and with brandy-sauce over it. I thought nothing of it. I liked it. I ate it freely. I sent up my plate for a second helping. On returning to my study, I began to want drink. *I wanted it.* The want began to sting and burn me. My mouth got dry. *I wanted it.* 'Well, surely, if I go now and have some —I have not had any for six years—certainly if I take just one glass now, it will allay this sort of feeling, and I shall be able to attend to my studies.' No! I thought of what I had been; I thought of what I expected to be; 'and now,' I said, 'I will fight it.' I locked the door and threw away the key. Then commenced the fight. What I did that night I do not know. I know I was on my knees a good deal of the time, but *what I did* I do not know. Some one came

in the morning, about eight o'clock, and knocked at the door. 'Come in.' 'The door is locked.' I hunted about, found the key, and opened the door. Two of my fellow-students entered. 'Why,' said one, 'what is the matter with you?' 'What do you mean?' 'Why, look at your face.' They took me to the glass, and my face, I saw, was covered with blood. In my agony, I had with my nails torn the skin from my forehead—*look at the scars now*—in my agony of wrestling against the desire for drink that cried through every nerve and fibre of my system. Thank God, I fought it; but it was forty-eight hours before I dared to go in the street."

You say, "That is a rare case; such cases are very rare." I wish they were. See to-day what men are sacrificing for the drink. See what they are giving up—home, friends, reputation, ay, even life itself; and that which is better than life, hopes of heaven, for the drink—dissolving the Pearl of great price in the cup, and drinking away their very hopes of heaven at a draught. Oh, it is awful when we go among them, and see them. What will they not do? What will they not sacrifice? What will they not give up? Do you say it is because they are weak-minded? No; it depends more on the temperament, constitution, and nervous organisation of a man whether, if he tries to follow your example, Mr. Moderate Drinker, he becomes intemperate or not—more than it does on what we call his strength of mind.

A man in Hartford, Connecticut, came home drunk. His little boy, of from three and a half to four years of age, ran forward to meet his father. Had that father been sober, the boy would have been nestling in his

bosom; but *he was drunk*, and, seizing the little fellow by the shoulder, he lifted him right over his head, and dashed him out of the second storey window, through sash, glass, and all; and on the pavement below they picked up the poor boy, with both his thighs broken.

Surely it is worth while to take part in this great temperance work. It is worth something to save life. As the day broke one fearfully stormy morning, a large barque ran on a bank of sand, eight miles from the British coast, and lay there at the mercy of the waves, filling with water. She rapidly began to settle, the waves breaking fiercely over her. Her boats were knocked to pieces; her hatches were forced up. Eighteen men were in the rigging, clinging to the shrouds of that sprung and broken foremast; the mainmast was gone. No hope was in their hearts; no help was nigh. But is there no hope and no help? They are seen from the shore. No sooner is the word passed, "A wreck! a wreck!" than the gallant boatmen spring to the beach. "Man the lifeboat!" Yes, but the waves are driving so furiously into shore. "*Man the lifeboat!*" Yes, but the snow is drifting in blinding squalls. "*Man the lifeboat!*"

One by one the noble fellows take their places. Out they dash in the teeth of the gale. "Oars out, my men. Steady! Oars out!" They are knee deep in water. The waves beat upon them; they are drenched, and all but drowned. Yet how cheerfully they bend their backs to the ashen oars, that threaten to snap asunder with the fury of the gale! "Hold on, every man of you!" Every

man holds on, whilst an immense wave rolls over, burying them fathoms deep. They rise and shake their locks. But where is the wreck? The atmosphere is so thick they cannot see it. Only part of the sinking vessel is seen. Are there any men in that tangled rigging? Yes, see! the rigging is full of them, "Now steady, men, steady! Keep clear of the wreck. Steady! Ah, we have them now!" She lays alongside: and one by one the poor, half-drowned, half-frozen wretches drop into the boat, and out she drifts into the boiling sea. Amid the peril of the return, hear them sing—

"Aye, cheerily, men,
Aye, cheerily, men,"

and the song mingles with the roar of the storm.

And now the lookers-out on the beach hail them as the boat nears the shore, "Lifeboat, ahoy! Are they all safe?" "Ay, ay, every man safe." How they do cheer! And the cheer is louder and more hearty than that which greets the champion boat in a race. And why? Because these men have saved human life.

Are there no wrecks—wrecks of men's intellect, wrecks of men's genius, wrecks of all that make men noble? Man the lifeboat—man the lifeboat, and board them. See how they are drifting. Helm gone, compass gone. Man the lifeboat! See how they are dashed by the fierce waves upon the strand, wrecked and ruined! Man the lifeboat, and board them! And if so be you help some poor struggling soul from this world's wickedness into the haven of peace and rest, cheer after cheer from human voices may never salute you; but the

shining, white-robed angels shall greet you, and the souls you have saved shall be as stars for ever in the crown of your rejoicing, and God's approval shall crown your noble endeavour.

III.

PREVENTION OR CURE—WHICH?

Sir Walter Scott once said, "It is all folly to talk of *writing down* to the capacity of children. Give them something to grasp after, and they will grasp that which will astonish you." We often hear shrewd remarks from children, and we call them "haphazard." But they are not. They are the result of a process of reasoning, and I want to give you one or two illustrations.

I knew two boys very well—at least, I knew their father very well—one of them was about ten years old. His name was Willie, and the other's was Jamie. Jamie was seated on the door-step, whittling a stick, as Yankee boys do. The other boy, Willie, had caught a fly, and, holding it in his fingers, he said, "What a queer thing a fly is—isn't it? Just look at its legs. Look at its wings. When I blow him, he'll buzz! Isn't it queer? I wonder how God made him." *That* has been a wonder to many. Professor Huxley cannot answer that question. No scientist can. "Jamie, how d'ye suppose God made a fly?" The little fellow, whittling away at his stick, said, "Why, Willie, God doesn't make flies as carpenters make things—putting them together and fitting them. God

says, 'Let there be flies!' and then there are flies." Call that "haphazard"? No! That boy had heard or read the sublime passage, "God said, Let there be light, and there was light;" and thence he reasoned out the creative power of the Almighty.

These children *remember*—and we underrate their capacity to remember, as well as to understand: and they imitate. You do not want to destroy the respect of a child for his father or his mother, do you? I glory in the boy who said, "I tell you what it is: If my mother says a thing is so, *it is so,* even if it is not so." What a profound conviction that boy must have had of his mother's veracity!

The Rev. Charles Garrett, I believe, tells us that a little fellow of thirteen years of age sat at the table with his father. The waiter came round and asked him what he would take. There was wine on the table. "What will you take?" "I'll take what father takes." The father had the decanter in his hand, just about to pour out the wine, and he dropped it as if it were fire. Laying his hand lovingly on the head of the boy, he said, "Waiter, I'll take water." Now, this is what we want, that fathers and mothers, and brothers and sisters, and all who have influence with children, shall help us in inspiring these children with a hatred of that which never benefited a human being, and has brought many to destruction and perdition.

I know people tell us sometimes, "It is no use working amongst children; it is no use labouring with them. They will sign your pledge and belong to your Band of Hope; and then they will break the pledge by-and-by." Why do you not raise the same objection against your

Sunday Schools? You cannot make all your Sunday scholars Christians, can you? But there is a large proportion of them who do come into the Church. And there is a large proportion of those who adopt the principle—and join these Bands of Hope, and sign the pledge of Total Abstinence, who do keep it; for I meet them by scores almost every week of my life.

Oh, I thank God that He who said, "Suffer little children to come unto Me," did not say "respectable children," or "well-educated children." No! He sends His angels into the homes of poverty and sin and crime, where you do not like to go, and brings out His redeemed ones; and they are as stars in the crown of rejoicing to those who have been instrumental in enlightening their darkness in the Mission School, in the Ragged School, or in the Bands of Hope Union.

Now let me from childhood pass on to youth and early manhood. There are a great many young men here. I am glad to see you; with all my heart I am. Every one of you has ambition. There is not a young man here who means that his position next year shall be lower than it is this year. You are looking forward to something better. You want to be manly. Now what is it to be manly? What is it to be brave? What is it to be noble? We have a class with us in the United States (and I do not know but what you have them here too), a class who think that to be manly is to brag, and to swear, and to swagger, and to trample on the decencies of human life, to smoke and drink and gamble, and to drive a fast horse. They think it is manly to toss off their glass like a man, and swear like a man. Are these men manly? *We* call them

"fast young men." Now there is not in this world a more contemptible set of men than what are called "fast young men." It requires no genius, no education, no intellect to drink and smoke and swear, and drive a fast horse. Give the materials to the biggest lunatic out of the asylum, and he will do it as well as the best "fast" young man you have in London. We are brave—when? *We are brave when we overcome that which threatens to overcome us.* Young men! we are heroes when we are able to chain some darling desire, and to say to some powerful passion, "Be still! I am your master." To be bold against an enemy is common to the brute. Man's prerogative is to be bold against himself; to conquer his own lusts, and wicked ambitions, and fancies, in the sacred name of duty to God. *That* is to be noble! *that* is to be brave!

Young men tell us (and I have heard it more than once) that they "must sow their wild oats." Remember this, young gentlemen, "Whatsoever a man soweth, that shall he also reap." If you sow corn, you reap corn. If you sow weeds, you reap weeds. If you sow to the flesh, you will of the flesh reap corruption. But if you sow to the Spirit, you will of the Spirit reap life everlasting. Ah, young men, look at that reaping; and then look at the awful reaping of men to-day—who are reaping as they have sown, in bitterness of spirit and anguish of soul.

I never can speak to an audience, but I think of my own experience. I never speak to men and women—and I never have, although I have spoken nearly eight thousand times—but I think of John Gough, wrecked,

desolate, broken-hearted, longing for better things with the better spirit, loathing the thing I had made myself. I have asked myself, "Was I born for this?" *How I hated and loathed myself!* Did I not bitterly understand that the wages was death?—that I was reaping the fruit of my sowing? And yet I went on . . . and on . . . and on; until, in the mercy of God, a kind hand was laid on my shoulder, and I was induced to take that turn in life which, by God's blessing and the kindness of friends, has brought me to this place to-night.

Our appeal is to young men. We want you to be *manly!* There is nothing dissipates manliness like the drink. We want you to be *men.* We want you to be *noble men.* We want you to be free from every debasing habit. We want you to be *gentlemen.* What is A GENTLEMAN? A true gentleman is noble, truthful, chivalrous, pure in speech, and in life. A true gentleman is awful to all bad men; lovely to all good men. In the presence of a true gentleman, none dare say a mean, low, ribald, or contemptible thing. Brave men love a true gentleman, feeling themselves nerved to do their duty better. Cowards slip away from his presence, like bats and owls before the sunlight. *Be a gentleman!* High birth does not constitute a gentleman.

A man may be the possessor of millions, and yet be a wretched, miserly, contemptible screw; while another who may have battled for his daily bread from infancy to old age, may possess the elements which constitute the true gentleman.

Now we come to another class of people.

We have been speaking of the children, and of the

young men. Now, we want to speak to the respectability, the beauty, the Christianity that is *not* with us in this movement. I regret that it should be so, but so it is. Why do we ask you to give up that which is to you, according to your idea of it, an innocent gratification? On what ground do we ask you? I will tell you. "Thou shalt love the Lord thy God with all thy heart, with all thy mind, and with all thy soul, and with all thy strength;" and the second commandment is like unto it—"*Thou shalt love thy neighbour as thyself.*" "On these two"—not on the one or the other—"hang all the law and the prophets." Now, it is for the sake of your neighbours that we ask you to abstain.

Now, who is my neighbour? Who are the grandest men the world has ever seen? Those who have sought for their neighbours out of their own circle of society. The cobbler at Portsmouth found his neighbours on the wharf —wretched, ragged, homeless children. He enticed them with roasted potatoes to come into his shop, that he might teach them spelling, and reading, and mending their clothes, and cooking their food; and to-day the greatest peer of the realm is not ashamed to preside at the anniversary meeting of one of these ragged schools at the East End. Yes, in Portsmouth they erected a monument to the memory, and kept the birthday, of poor JOHN POUNDS, the Portsmouth cobbler.

FLORENCE NIGHTINGALE searched for her neighbours amongst the bruised and battered soldiers of the Crimea. MARY CARPENTER found her neighbours among the city arabs. Mrs. WIGHTMAN found her neighbours among the drunkards of Butcher's Row, Shrewsbury. Mrs. BAYLY

found her neighbours among the denizens of the Kensington Potteries. SARAH PELLAT found her neighbours among the Californian gold-diggers. Miss DIX found her neighbours in the Asylums for the Insane.

Ah, these are God's heroes and heroines, they who seek for their neighbours out of their own circle of society.

What we want is *your* aid, *your* influence, *your* co-operation, in this great work. And *it is a work!* It is a work that is to be successful by-and-by. Patience! I am not one of those who believe the bell is being cast that will toll out the death-knell of intemperance in a few years from now. Oh, no! it is a hard fight and a long fight, a strong fight and a vigorous fight. But there is VICTORY at the end—that is sure! I may not see it. These children that we are training may not see it. But it *will come.* By-and-by, the heroes who have laboured shall come up over a thousand battlefields, waving with bright grain that shall never be crushed in the accursed distillery. By-and-by they shall come up through vineyards, under trellised vines of grapes hanging in all their purple glory, never to be pressed into that which can debase humanity. By-and-by, they shall come to the last drunkard's wife, and wipe her tears away. There shall be victory by-and-by! They shall come to the last neglected child, and lift him up to stand where God meant he should stand. By-and-by, they shall come to the last drunkard, and nerve him to burst his burning fetters, and make a glorious accompaniment to the song of freedom by the clanking of his broken chains. By-and-by, the triumph of this and all great moral enterprises shall usher in the day of the final triumph of the Cross of Christ. I believe it; and for that I work.

And when I die, I pray God I may die in the harness, battling for this, with the hope that there is a better day coming by-and-by, and a prayer, "God speed the right!"—ever praying, ever working, till victory shall perch upon our banner. Then we will lay our laurels at His feet, and cast our crowns before Him, joining in the mighty anthem of praise unto Him who hath subdued all things unto Himself.

INFECTIOUS DISEASES.

CHAPTER I.

THEIR PRODUCTION.

We have now learnt how to keep the individual and the home healthy, and have come to see how disease follows the breaking of some law of health. But, though we obey these laws for ourselves and apply them in our houses, we are still at the mercy of whole armies of unseen enemies who lurk here, there, and everywhere around us, always ready to attack us, giving rise to what are known as "infectious" diseases.

It is necessary, therefore, that we know something of these diseases—how they are produced, how they are propagated, and how they may be prevented.

The list of such "infectious" diseases is a long and weighty one. It would include each and all of the following: Consumption, typhoid fever, diphtheria, scarlet fever, measles, whooping cough, small-pox, cholera, yellow fever, ague, pneumonia, and erysipelas, with probably also hydrophobia, leprosy, and influenza, not to mention others of less importance.

For very many years it was assumed that these diseases were like so many accidents which might befall all people alike, and it is only of recent years that we have learnt the

truth that they are more or less preventible, and that they obey the laws of nature just like other diseases. Thus we now know that they are due to the invasion of certain "germs," as they are called, into the body, and to their growth in the body at the expense of the tissues.

These "germs" further prove to be nothing more or less than parasitic plants, so tiny that they require to be highly magnified before they are visible to our sight, and so light that millions would not weigh a single grain. Like larger plants, they differ one from another, and require the presence of certain conditions before they can grow and multiply to advantage. Then, however, they grow with amazing rapidity, and the soil in which they multiply is the human body. Already some hundreds of germs are known, and have been as carefully cultivated and described as any of the larger plants which beautify our gardens and parks. Some are hardy as weeds, and will flourish in any state of the human body, others require some predisposition in the system, or they perish in the struggle for existence. Some, again, exhaust the soil, that is the body, after one crop, and "come up" or produce disease only once, whilst others crop up again and again, one crop seeming to facilitate another. Each has its own peculiar habitat or chosen spot, its period of incubation and its peculiarities of growth, and the resultant is the disease which we term "typhoid fever," "scarlet fever," and the like. All are more or less dangerous to life, and, even where not immediately fatal, they frequently leave behind as traces of their action some weakness, general or local, which affects the future of the individual often to a most serious extent.

Such, then, are the causes of the "infectious diseases."

Let us view them a little closer. It is vain to ask whence the first "germ" came; the question is as difficult as that of whence the first of anything. But once originated, their future extension is easily explained. For, unfortunately, they are living things, and do not cease to exist with the end of the disease which they have produced. On the contrary, their seeds are given off during the illness, and even after it, to grow again and multiply wherever they meet with the heat, moisture, and nourishment suited to them; and too often this is in the bodies of people previously unaffected by them.

Again, both the means and the time of the fresh infection are very varied. Thus some germs are given off with the breath, such as the germs, for example, of consumption and diphtheria; others with the excreta, as those of typhoid fever and cholera; others, again, with the scales from the skin, as well as the breath, &c., as those of scarlet fever and measles; and others with almost all the secretions, as small-pox and the like. In some, as measles, the first few days are the period of greatest infection; in others, as typhoid fever, the infection is possible during many weeks; whilst in others, as scarlatina, it is greatest towards the close. Some, again, die before they have gone far, unless they find a suitable soil; others can pass all round the world, and undergo great extremes of temperature and dryness, and yet remain alive and active. Most, if not all, can find capital resting quarters, and even breeding grounds outside the human body, but some seem to find in the human organism alone the conditions which are most favourable to their most prolific growth. The question of

the external habitat of the different germs is one of great importance, since, if we can find out their resting-places, and destroy the germs and other seeds therein contained, we shall be able to do a great deal to limit the dangers of fresh invasion.

We have yet to consider how these germs enter fresh human bodies, or, in other words, how fresh cases of infectious disease arise.

A very large class undoubtedly enter with the air we breathe; that is, the atmosphere is the carrier of infection. Such are the germs of consumption, measles, whooping cough, scarlet fever, diphtheria, &c. Here the point of attack is the nose, throat, and air passages, and the disease produced begins in a special irritation or inflammation of these parts, followed in a definite time by the symptoms in other parts peculiar to the disease. Others, again, as typhoid fever and cholera, seem to prefer to float into the system with articles of food and drink, and attack primarily the stomach and bowels. It is not of course to be supposed that any are necessarily limited to one means of invasion. On the contrary, it is probable that they may enter through both channels and even through abrasions in the skin and elsewhere. But it is equally probable that each has its more common channel through which it enters the system, and once in the system, they not only produce disease in the parts at first attacked, but in the local struggle for existence they secrete certain poisons, which enter the blood and affect the system generally.

Two illustrations may be given of the way in which these germs of infectious disease lurk in air, earth, food,

and drink during their transit from one human body to another. Take, first, the case of the typhoid germ. In typhoid fever we have a disease which has become a scourge. How can we account for its wide prevalence? We find that the germs are passed out with the contents of the bowels. Were they at once destroyed no fresh cases of disease would arise from the germs at present contained in the bodies of typhoid patients. So far from being destroyed, however, in the past and even in the present, we find them in the country deposited in earth-closets, cesspools, and similar receptacles, and in the towns and cities carried from earth-closets and trenched on to the surface of arable lands. Some follow the course of the natural drainage, and percolate into various sources of drinking water; others, no doubt, perish for lack of suitable surroundings; but for the majority the earth supplies both germs and their spores with appropriate winter quarters. Summer comes with its heat and dryness; the surface layers of the contaminated soil become dried into dust, and both germs and atoms of dust are blown hither and thither, according to the direction of the prevalent winds. In their flight the germs may fall into stagnant drains and damp filth of every kind, the very conditions favourable for their propagation. If stagnant water and filth were removed, a great source of typhoid extension would undoubtedly be prevented, and a marked lessening in the amount of typhoid fever would follow a proper system of surface cleansing. But some germs may be blown also into tank-water obtained from roofs, or into open wells from which water is taken, and in which milk cans are washed,

or upon milk, water, and articles of food left exposed to atmospheric contamination, or they may enter water-pipes through the drainage of gutters, and the like; and by these unexpected means, as well, possibly, as by transmission through the air in certain cases, the germs of typhoid fever may enter fresh individuals and produce fresh cases of disease.

Or take the case of consumption. Here the germs pass out generally with the expectoration. This seems harmless, and indeed probably remains so, as long as it continues moist. But once allow this to dry, and the germs enter the air in millions. Pollution of air with the germs of consumption is thus possible wherever the consumptive patient spits upon the floor, or elsewhere than into a damp cup, the contents of which are systematically thrown into the fire. The use of a handkerchief that is allowed to dry is similarly a source of danger. Of course not every one who inhales the germs of consumption becomes consumptive (fortunately the healthy tissues are not suited to the growth of this germ), but it is certain that innumerable cases of consumption have arisen from this simple neglect to destroy the germs before they became dangerous, by allowing them to enter the surrounding air.

We now know something of these "germs," their means of exit and of entrance. In all cases it must be remembered that they are invisible, and may be present when we can see nothing even suggestive of their presence in any of the channels of communication. Indeed, the carriers of infection are often little suspected. A glass of unfiltered water, a tumbler of unboiled milk, an old

strip of flannel, an apparently clean handkerchief—even a mother's or a sister's kiss. In many cases, sick persons are not properly isolated. Slight cases of sickness, and cases not completely recovered, are allowed to mingle freely with the healthy in schools, work-places, churches, and theatres. Boarding-schools break up to scatter the germs through the different homes. Infected people lodge in crowded boarding-houses. Dress and furniture makers, laundresses, milkmen, and bakers spread disease with their infected goods. Discharges from nose and throat are allowed to pollute houses, railway carriages, trams, and cabs; those from the bowels are mixed with the soil, and pollution of earth, air, and water becomes almost a matter of certainty. The extent to which this sometimes occurs may be illustrated from the careful statistics of the Registrar-General of England. He mentions that upon certain occasions, which were observed as accurately as possible, one case of typhoid fever spread to 168 in eight weeks, one of scarlet fever to 256 in seven weeks, and one of cholera to 625 within eight days.

Thus, for purposes of health, we may regard ourselves as fortresses in a land which should be one of plenty and peace, but which is open to invasion by these wandering bands of robbers who plunder and kill and know no mercy within their powers. And whilst in much of all that touches our daily life there is usefulness and beauty, in much also there thus lurks the possibility of injury and even the certainty of damage. We cannot live without air, and yet the very air of life may bring disease and even death. The earth has well been called our mother, and yet mother-earth may prove our destroyer as well as our

grave. Food and drink are essential to life, and yet a mother's milk may prove poisonous, and what should nourish may weaken and destroy. Imagine, therefore, the state of such a fortress, in such a land, if ignorance is allowed to guard the gateways, defend the ramparts, and arm the defenders. Never for a moment can it be considered safe. The degree of ignorance will measure the degree of danger. But with knowledge must come also obedience to law and self-control, otherwise the battle will still be lost. Like the rest of nature, man must live within the circle of his laws. If he stray outside their bounds he will incur the penalty which always accompanies disobedience. Then, as he increases in knowledge and in self-restraint, the number of his foes will be an ever lessening one. Diseases due to ignorance will probably be the first to reach the minimum; diseases due to disobedience will slowly follow; whilst diseases due to inheritance will linger slowly but surely lessening, till the cycle of the ages is complete. Then, in the fulness of time, there will remain only "that last enemy whose name is death."

CHAPTER II.

THEIR PREVENTION.

THE idea of a world in which there will be no consumption, typhoid fever, diphtheria, scarlet fever, whooping cough, cholera, or small-pox, is already germinating in the minds of sanitary reformers. How is this "golden age" to be speeded? As a matter of course there are difficulties

in the way—many and almost insurmountable. As we have seen, the different germs exist in millions in earth, air, and human beings at present diseased. Everywhere the necessary external breeding grounds abound, and almost everywhere we may find the carriers of infection also. Ignorance is almost universal, and where some little knowledge is found, it is limited and imperfect, and too often hampered by apathy and neglect. It will be many a generation, therefore, before we shall be able to say that we have eradicated infectious diseases. But we can all help in the onward progress, and though we may not eradicate, we can still materially lessen the number of such cases, and even succeed in saving from infection many of those who are near and dear to us.

How, in the first place, can we deal with the enormous armies of germs which already exist outside our bodies? Frequently these germs are found quite outside our reach. Even when accessible, it is much more difficult to destroy them than is generally supposed. The many drugs known as "deodorants" are quite useless, and practically increase the danger of infection, because they give rise to a false sense of security. Even those which are dignified with the name of "disinfectants," and which may prove more or less effective under certain favourable conditions, are too often almost as powerless, especially when used on anything like an extensive scale. We have indeed to trust more to the slow cleansing of earth and air, which is accompanying improved sanitary law and practice, than to any artificial means of destroying the germs themselves. It is only when we cease to live surrounded by damp and filth, and no longer inhabit houses in which all the rules

of sanitary construction are broken, that we can expect as individuals and communities to be exempt from the visitation of these insidious foes.

But we can do much more than wait for the help which will come with this gradual improvement in our surroundings. We can minimise the danger of personal attack by guarding well the means of entrance of disease germs, and we can prevent further contamination of earth, air, and water by close attention to the means of exit. It is possible, if we will but use the knowledge which we already have, to make the entrance of fresh germs frequently an impossibility, and to cease to add to the armies already in existence outside.

How is all this to be accomplished? That is the practical question with which we have now to deal. In the first place, each case of infectious disease must be considered as a source of danger, and treated accordingly. If it were a case of dynamite, how carefully we should handle it and how cautiously we should store it; and yet it is much more dangerous than dynamite. Proper storage or *isolation* is thus the first essential, and this isolation must be prompt, since infection may be possible from the outset. Such separation of the sick is now made imperative by the law of the land, but how frequently is it delayed until too late, and even when attempted how inefficiently is it performed? For this isolation is effective only so far as those who separate the sick understand the modes of contagion, and carry out the means necessary to prevent its spreading. For the proper performance of the latter practical experience is necessary, and a continuance in well doing, so long as infection remains possible. No

doubt that disinfection, or the destruction of the germs at the point of exit, will be more efficiently carried out when the sanitary authorities provide a proper staff, instructed and practised in the disinfection of infected rooms and discharges, and when proper disinfecting chambers also are provided for the perfect purification of infected articles of all kinds. But until such is the case the individual householder must perform those duties for himself, under such supervision from his doctor or inspector as is attainable.

Meantime it is sad to see how slow we are to grapple with this all-important problem, and how far-reaching are the consequences of such neglect. This may be well illustrated by the history of typhoid fever in and around Melbourne. Introduced some fifty years ago, it was long before it was recognised that the infection of typhoid fever was bound up in the disposal of the excreta. Owing to this ignorance, Melbourne has been able to endow the successive suburbs with their subsequent epidemics of this fell disease. Even when this source of danger was fully recognised, and the law had advanced to the point of suggesting a separate service for the carriage of typhoid excreta and their subsequent destruction by fire, even then it was only last year and in a few towns that a start was made to provide the necessary appliances for the proper carrying out of the legal requirements.

But prevention of exit is only half the battle. The practical question which overshadows all others is the prevention of entrance wherever this is possible. In connection with this point we must remember that there are two main gateways into the fortress of health—the lungs

and the stomach—and that entrance is possible through either, in ways almost infinitely varied. We have already seen that the air is the commonest and most important medium of attack in a large proportion of cases. In the darkness of our ignorance or neglect, innumerable germs may arise, float onwards, and strike mercilessly at our very lives. Against most of such enemies we are well-nigh powerless. We cannot help breathing, and we can seldom ensure that the entrant air has been purified of infectious germs; but we can to a great measure avoid contact with infected cases—we can to some extent keep out of the way of contaminated air—by attention to drains, closets, dust-bins, and the like; we can minimise the number of breeding grounds and lurking places of these air-borne germs; and by attention to our general health we can frequently render the system secure against the spread of disease, even though the germs have been able to gain access into our air passages.

But we can guard the other gateway—the stomach—much more efficiently, and yet how seldom is the attempt properly made! Thus, consumption of the bowels in children frequently enters with the food, and typhoid fever and cholera swim in along with water and milk, though in both cases prevention may be a matter entirely within our control. For by raising the temperature to the boiling-point, the risk of infection through articles of food and drink may be materially reduced, if not entirely overcome. By filtration, again, germs may be removed from certain fluids, provided, of course, the pores of the filter are finer than the germs themselves. Unfortunately this is very far from being the case with the

filters in ordinary use, such as those made from charcoal, and the like. For perfect security of filtration we need a very fine filter. And even then regular cleansing is required, as a dirty filter is almost as dangerous as an imperfect one. Thus by attention to the food and drink much can be done. The risk of individual attack may be very materially reduced, even though absolute immunity may not be promised. In the case of typhoid fever, for example, the following simple precautions may save many from attack:—

1. Avoid all uncooked vegetables.
2. Boil or scald all milk before use.
3. Protect all articles of food or drink, so that contamination through the means of infected flies or of infected air becomes almost impossible.
4. Either boil all drinking water as in the preparation of "tea," or if alone, for half an hour, drinking only the upper portion on cooling; or filter all such water through a fine filter, taking care to have the filter well cleaned once a week at least.

But there are other matters concerned in the production of infectious disease besides the entrance of the germ, since it by no means follows that entrance is necessarily followed by disease. For disease to be produced, it is necessary that the germ shall grow at the expense of the system into which it has been introduced; and we find every degree of virulency amongst the different kinds of germs. Some are so virulent that they can increase and multiply even in the healthiest tissues—others, like those of consumption for example, can do little, if any, harm in the body of a healthy person. They require a weakness of the part of the system, otherwise they perish soon after they are introduced. With many, such as those

which are generally called children's diseases, age confers more or less immunity, and it becomes rare to find them able to produce disease in adult life. The individual himself, again, may be able to increase his defensive power by attending to his general health, and so to limit the results of infectious disease, or even at times avert it altogether.

There remains only the practical carrying out of the principles thus inculcated. As already stated, these are matters of experience and not reading, and at first, at all events, they will need to be directed and supervised by expert skill. The following hints should prove useful:—

I. Separate the sick at once; if possible in a room detached, or at the top of the house. The room to be airy, light, and provided with both fireplace and window. Take out everything except the bedding, utensils, iron bed, and wooden chair.

II. Hang over the door a sheet kept wet with a solution of carbolic acid (1 part to 40 of water), which you can obtain from the chemist. Let nothing come out of the room unless steeped in boiling water or disinfectant solution (*vide* IV.) The attendant should wear a print over-dress in the sick-room, and should be scrupulously clean about the hands, face, and dress, using carbolic disinfecting soap. Allow no one else in, except by permission of the doctor.

III. Children living in the same house should not attend school or visit other houses; they are best out in the open air.

IV. To disinfect the clothing and bedding, steep the articles in a solution of carbolic acid (1 to 20 of water) for some hours, and then bake or boil them with soda. In small-pox, all discharges must be subjected to the solution. In scarlatina anoint the body daily with carbolic ointment, and burn all soiled linen, rags, &c. In typhoid fever and cholera, instantly disinfect the stools with the carbolic solution in at least equal quantity, and either destroy the mixture by burning, or bury deep in the earth far away from any water supply. Dead bodies should be placed quickly in

coffins filled with sawdust saturated with the solution, and at once removed. Soluble phenyle and Condy's fluid are convenient forms of disinfectant solution. Chloride of lime (1 tablespoonful to the bucket of water) may be substituted for the carbolic in the disinfecting of clothing. Green copperas ($1\frac{1}{2}$ lbs. to the gallon of water) may be used in place of either, in the disinfecting of the discharges from the bowels, but not in the case of bed linen.

V. The convalescing sick must not go about until pronounced harmless by the doctor.

VI. When the sickness has ended, disinfect the sick room as follows:—Mop walls, ceiling, furniture, &c., with the solution, wash floors and skirtings, &c., with hot soap and water, and white-wash walls, &c.; then take 3 lbs. of sulphur to every thousand cubic feet of space, and place portions in earthenware saucers floated in tubs of water, close windows, doors, and all openings with paper and paste, and light the sulphur with hot coals, leave it to burn for 4 or 5 hours, then open windows, &c., and in 24 hours the room is ready for use.

VII. At all times, and especially during epidemics, look to the surroundings of the house. Examine drains, closets, sinks, dust-bins, &c., and have errors in construction and cleaning remedied. During epidemics cleanliness and hot water are sufficient for washhouses. Drains and sinks may require special flushing and disinfecting with chloride of lime (1 lb. to the gallon of water). Keep the earth-closets sweet by adding sifted ashes, sawdust, or dry earth. Where the water or milk supply is not certainly pure, boil the milk and filter and boil the water before using internally.

If these simple rules were efficiently and generally carried out, most infectious diseases would be practically stamped out of existence.

Two infectious diseases of some importance have been left out of the foregoing table, and require therefore some further consideration. These are diphtheria and consumption. Diphtheria is a germ disease which has recently acquired such a foot-hold amongst us that at present it almost disputes with typhoid fever the right to the title of a national scourge. But between it and typhoid fever

there are certain differences, interesting in the light of what has been already said as to the mode of transmission of germs generally. This, whilst the poison of typhoid fever infects mainly through polluted food and drink, and has its seat therefore in the bowels, the poison of diphtheria attacks most commonly through the atmosphere, and takes first root at the back of the nose and throat. Given off with the breath, the germs pollute the air, the bedding, the clothing—in fact, everything within reach. Pillows, beds, mattresses, furniture, blankets, handkerchiefs, &c., can thus scarcely avoid becoming carriers of contagion. Even with the use of some aerial disinfectant, such as fumes of sulphur and chlorine, some germs are almost certain to escape from the room. And now see the importance of clean surroundings. In the absence of filth and decomposing matters the germs lose valuable breeding-grounds, and their infective power becomes materially limited; but where the air is laden with emanations from decaying fruit or vegetables, from sinks, drains, and other receptacles of filth, and especially where night-soil is allowed to remain, we help the germs all we can, short of taking them forthwith into our unaffected bodies. Diphtheria illustrates also the value of age as a protection against invasion. It is the delicate, sensitive throat of the child that falls the readiest victim After the age of ten the susceptibility diminishes, but it remains in considerable degree even in adults. Again, articles of food, such as milk, may become infected and communicate the disease. It is not unfrequently spread by kissing the patient, and a similar disease seems to prevail in some of the domestic animals, such as cats and poultry.

Consumption, again, a disease which in one form or other is responsible for the deaths of more than one-sixth of the civilised world, is due to the growth of a germ in the tissues of the body, especially in the lungs. We have already shown what are the carriers of infection. It is only of late years, however, that its infectiveness has been absolutely demonstrated, mainly because the constitutional element in causation was so important that it overshadowed the entrance of the germ. In other words, the system had to be prepared for the reception of the germ if the latter was to grow at its expense. Hence it is still common to find the neglect of the precautions necessary to prevent the free passage of the germs into the air, and hence also many cases of consumption arise which should and could have been prevented. It cannot be too widely known, therefore, that the germs should be destroyed by the daily burning of the expectoration after storage for the 24 hours in some suitable glass or cup, and that the use of linen articles, as handkerchiefs, or the habit of spitting, are both grave sources of danger. In the case of children, also, it is not wise to bring up a child upon the milk of an affected mother, and where cow's milk is used it must be seen not only that the cow's udders are not diseased, but that, as a wise precaution, all milk is boiled or scalded before use.

ACCIDENTS AND EMERGENCIES.

It has been considered advisable to incorporate in this manual some suggestive directions as to the manner in which immediate assistance can be wisely given in cases of accident and emergency. It must be understood, of course, that *wise* assistance is necessary, otherwise with the best of intentions, the result may be disastrous. As the proverb says, "A little knowledge is a dangerous thing," and this may be especially the case when human life is at stake. However, a little knowledge is better than none at all, and, if used with prudence and common sense, the good results will far outweigh the bad.

What to do till the Doctor comes.

N.B.—Let there be in every home a place known to every member of the household (but out of the way of the children) where are kept ready for immediate use a pair of scissors, three or four large needles (threaded), a few prepared roller bandages, small rolls of old clean linen and flannel, some lint, adhesive plaster, oil silk, wadding, turpentine, olive oil, and small bottle of a cheap disinfectant solution.

Bleeding from the Nose.—Apply cold water or iced compresses to the nose, neck, or forehead. If alone, compress the nostril with the opposite hand and raise the arm of the same side high above the head. If these means fail, inject alum in powder or solution into the cavity.

Broken Bones.—Perfect quiet and rest must be enforced. Only

move the patient if absolutely necessary. Place the part in the natural position, and prevent further mischief by some sort of splints. Portions of a broken box, rolls of newspapers, umbrellas, sticks, make excellent supports. If a leg be broken, after applying splints, tie the injured and the sound leg together at ankle and knee, and support both legs on a piece of board, to which they should be fastened. Slit trousers up the seam, and never remove the patient until the whole leg is safely supported. More injury is sometimes done after the accident than by the accident itself.

Bruises and Sprains.—If a bruise can be treated at once apply ice or vinegar and water, and keep the part at perfect rest. Should time have elapsed, and swelling continue, apply relays of hot fomentations, still keeping the part at rest. In later stages, warmth and very gentle friction, with flannel bandaging. Sprains require perfect rest and support. Immediate plunging in cold water may prevent swelling, but warm applications are necessary to remove it, with bandaging for support. A day's absolute rest at time of accident is worth a month's afterwards; therefore, never neglect a sprain.

Burns and Scalds.—Carefully remove or cut off clothing, and avoid breaking any blisters. If injury be slight and no wound exist, immerse part in cold water or a strong lukewarm solution of washing soda. If severe, cover at once with flour, or olive oil and lime water in equal quantities, and wrap carefully in cotton wool or wadding, so as to keep out all air. Leave the dressing on as long as possible. When a dress catches fire, lie flat upon the ground and roll over. Bystanders should stifle the flames with water, clothing, or whatever is at hand.

Choking.—If slapping on the back gives no relief, open the mouth, and with one or two fingers hook out or displace the foreign body.

Convulsions in Infants.—Warm bath 100° for a few minutes, with, if necessary, cold to the head; a mild emetic followed by a dose of castor oil.

Drowning.—Clear the throat. Excite breathing by slapping the chest, by smelling-salts, &c. If these fail, place a folded coat under the shoulders; draw the arms up alongside of the head, then lower them and press them against the sides; do this fifteen times a minute, and continue till breathing is restored; then, but not till then, promote warmth and circulation by friction, heat to the heart, thighs, and soles, and warm drinks.

Fits in Adults.—If you are sure it is a fainting fit only, as from fright, fatigue, bleeding, &c., keep the head low. Neglect of this rule has caused many deaths. Later on, give warm tea. In all other fits, keep quiet, raise the head slightly; prevent self-injury; see that breathing is easy, and do not give anything by the mouth.

Foreign Bodies in the Ear.—Don't meddle unless the foreign body be close at hand and can be easily seen. You may do much mischief.

Foreign Bodies in the Eye.—Don't rub. Bathe the eye well, and, if lime or mortar be present, use weak vinegar and water. If still in the upper lid, turn the lid over a pencil by pulling the eyelashes upwards, and brush it off gently with handkerchief or camel's-hair brush. After all, drop some oil between the lids, and keep the eye closed.

Leech Bites are often very troublesome. Try direct pressure with finger, if over a bone or resisting medium. If elsewhere, apply calico, made up into a hard cone, and fix over the bite with a bandage. Never apply leeches to the eyelids.

Poisoning.—Produce vomiting by mustard or salt and water, or soap and warm water. If pain and purging, give two teaspoonfuls of chalk, whiting, or magnesia in a tumbler of milk or water. If sleepy, keep awake by walking about, and strong coffee.

Snake Bite.—Tighten a ligature above the wound. Suck, cleanse, and cauterise the bite. The sooner this is done the better. Give stimulants largely, but judiciously.

Stings of Insects.—Apply, at once, liquid ammonia, or soda and water, or the "blue bag."

Suffocation.—Fresh air at once; clear the throat; loosen everything round the chest; dash cold water; apply smelling-salts. Continue as in drowning.

Sunstroke generally occurs from over-exertion in hot weather. It may come on without exposure to the sun's rays. Real sunstroke should be distinguished from mere fainting from weakness or exhaustion. The person should be removed into a cool place, have cold applied to the head, and if the skin is hot and flushed, it should be sponged with cold water. Spirits or other stimulants should not be given. All drinks should be cold, and the person must not be bled.

Wounds and Cuts.—Wash the wound thoroughly with cold water, see that the bleeding ceases, put the edges of the wound together, and put on strips of plaster or cold-water rags. To stop bleeding in

all cases raise the limb and apply pressure directly over the wound either by finger or rolled-up handkerchief. If the bleeding be bright scarlet and in spurts, tighten a bandage round the limb on the side nearest the heart. If dark, and in a stream, tighten the bandage round the limb on the side away from the heart. An elastic gas-tube, pair of braces or garters form good bandages. Apply whilst the limb is raised up. Wounds of the head should be cleared of hair by cutting or shaving.

These hints are not intended to do instead of the doctor. Send to him at once when anything serious is the matter.

Directions for Restoring the Apparently Drowned.

I.—*Dr. Marshall Hall's Method.*

Send immediately for medical assistance, blankets, and dry clothing, but proceed to treat the patient instantly on the spot, in the open air, with the face downward, whether on shore or afloat; exposing the face, neck, and chest to the wind, except in severe weather, and removing all tight clothing from the neck and chest, especially the braces.

The points to be aimed at are—first and immediately, the restoration of breathing; and secondly, after breathing is restored, the promotion of warmth and circulation.

The efforts to restore breathing must be commenced immediately, and energetically, and persevered in for one or two hours, or until a medical man has pronounced that life is extinct. Efforts to promote warmth and circulation, beyond removing the wet clothes and drying the skin, must not be made until the first appearance of natural breathing; for if circulation of the blood be induced before breathing has recommenced, the restoration to life will be endangered.

II.—*To Restore Breathing.*

To Clear the Throat.—Place the patient on the floor or ground with the face downwards, and one of the arms under the forehead, in which position all fluids will more readily escape by the mouth, and the tongue itself will fall forward, leaving the entrance into the windpipe free. Assist this operation by wiping and cleansing the mouth.

If satisfactory breathing commences, use the treatment described

below to promote warmth. If there be only slight breathing—or no breathing—or if the breathing fail, then

To Excite Breathing.—Turn the patient well and instantly on the side, supporting the head, and—

Excite the nostrils with snuff, hartshorn, and smelling-salts, or tickle the throat with a feather, &c., if they are at hand. Rub the chest and face warm, and dash cold water, or cold and hot water alternately, on them. If there be no success, lose not a moment, but instantly—

To Imitate Breathing.—Replace the patient on the face, raising and supporting the chest well on a folded coat or other article of dress.

Turn the body very gently on the side, and a little beyond, and then briskly on the face, back again, repeating these measures cautiously, efficiently, and perseveringly about fifteen times in the minute, or once every four or five seconds, occasionally varying the side.

[*By placing the patient on the chest, the weight of the body forces the air out; when turned on the side, this pressure is removed, and air enters the chest.*]

On each occasion that the body is replaced on the face, make uniform but sufficient pressure with brisk movement on the back between and below the shoulder-blades on bones on each side, removing the pressure immediately before turning the body on the side.

During the whole of the operation let one person attend solely to the movements of the head and of the arm placed under it.

[*The first measure increases the Expiration—the second commences Inspiration.*]

*** The result is Respiration or Natural Breathing—and, if not too late, Life.

Whilst the above operations are being proceeded with, dry the hands and feet, and as soon as dry clothing or blankets can be procured, strip the body and cover or gradually reclothe it, but taking care not to interfere with the efforts to restore breathing.

III.—*Dr. Silvester's Method.*

Should these efforts not prove successful in the course of from two to five minutes, proceed to imitate breathing by Dr. Silvester's method, as follows :—

Place the patient on the back on a flat surface, inclined a little upwards from the feet; raise and support the head and shoulders on a small firm cushion or folded article of dress placed under the shoulder-blades.

Draw forward the patient's tongue, and keep it projecting beyond the lips; an elastic band over the tongue and under the chin will answer this purpose, or a piece of string or tape may be tied round them, or by raising the lower jaw the teeth may be made to retain the tongue in that position. Remove all tight clothing from about the neck and chest, especially the braces.

To Imitate the Movements of Breathing.—Standing at the patient's head, grasp the arms just above the elbows, and draw the arms gently and steadily upwards above the head, and keep them stretched upwards for two seconds. (*By this means air is drawn into the lungs.*) Then turn down the patient's arms, and press them gently and firmly for two seconds against the sides of the chest. (*By this means air is pressed out of the lungs.*)

[Repeat these measures alternately, deliberately, and perseveringly, about fifteen times in a minute, until a spontaneous effort to respire is perceived, immediately upon which cease to imitate the movements of breathing, and proceed to induce circulation and warmth.]

IV.—*Treatment after Natural Breathing has been restored.*

To promote Warmth and Circulation.—Commence rubbing the limbs upwards, with a firm grasping pressure and energy, using handkerchiefs, flannels, &c. (*By this measure the blood is propelled along the veins towards the heart.*)

The friction must be continued under the blanket or over the dry clothing.

Promote the warmth of the body by the application of hot flannels, bottles, or bladders of hot water, heated bricks, &c., to the pit of the stomach, the armpits, between the thighs, and to the soles of the feet.

If the patient has been carried to a house after respiration has been restored, be careful to let the air play freely about the room.

On the restoration of life, a teaspoonful of warm water should be given; and then, if the power of swallowing has returned, small quantities of wine, warm brandy and water, or coffee should

be administered. The patient should be kept in bed, and a disposition to sleep encouraged.

General Observations.

The above treatment should be persevered in for some hours, as it is an erroneous opinion that persons are irrecoverable because life does not soon make its appearance, persons having been restored after persevering for many hours.

Appearances which generally accompany Death.

Breathing and the heart's action cease entirely; the eyelids are generally half closed; the pupils dilated; the tongue approaches to the under edges of the lips, and these, as well as the nostrils, are covered with a frothy mucus; coldness and pallor of surface increase.

Cautions.

Prevent unnecessary crowding of persons round the body, especially if in an apartment.

Avoid rough usage, and do not allow the body to remain on the back unless the tongue is secured.

Under no circumstances hold the body up by the feet.

On no account place the body in a warm bath, unless under medical direction, and even then it should only be employed as a momentary excitant.

The following instructions will be found valuable in cases where the rescuer has to swim to the assistance of those who are in danger of drowning:—

INSTRUCTIONS FOR SAVING DROWNING PERSONS BY SWIMMING TO THEIR RELIEF.

1st. When you approach a person drowning in the water, assure him, in a loud and firm voice, that he is safe.

2nd. Before jumping in to save him, divest yourself as far, and as quickly, as possible of all clothes; tear them off if necessary; but if there is not time, loose at all events the foot of your drawers if they are tied, as, if you do not do so, they fill with water, and drag you.

3rd. On swimming to a person in the sea, if he be struggling, do not seize him then, but keep off for a few seconds, till he gets quiet, which will be after he gets a mouthful or two; for it is sheer madness to take hold of a man when he is struggling in the water, and if you do you run a great risk.

4th. Then get close to him, and take fast hold of the hair of his head, turn him as quickly as possible on to his back, give him a sudden pull, and this will cause him to float; then throw yourself on your back also, and swim for the shore, both hands having hold of his hair, you on your back and he also on his, and of course his back to your stomach. In this way you will get sooner and safer ashore than by any other means, and you can easily thus swim with two or three persons; the writer has often, as an experiment, done it with four, and gone with them 40 or 50 yards into the sea. One great advantage of this method is that it enables you to keep your head up, and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair and throw both the person and yourself on your backs. After many experiments, I find this vastly preferable to all other methods. You can, in this manner, float nearly as long as you please, or until a boat or other help can be obtained.

5th. I believe there is no such thing as a death-*grasp*, at least it must be unusual, for I have seen many persons drowned, and have never witnessed it. As soon as a drowning man begins to get feeble, and to lose his recollection, he gradually slackens his hold until he quits altogether. No apprehension need therefore be felt on that head when attempting to rescue a drowning person.

6th. After a person has sunk to the bottom, if the water be smooth, the exact position where the body lies may be known by the air-bubbles which will occasionally rise to the surface, allowance being, of course, made for the motion of the water, if in a tide-way or stream, which will have carried the bubbles out of a perpendicular course in rising to the surface. A body may be often regained from the bottom before too late for recovery by diving for it in the direction indicated by these bubbles.

7th. On rescuing a person by diving to the bottom, the hair of the head should be seized by one hand only, and the other used, in conjunction with the feet, in raising yourself and the drowning person to the surface.

8th. If in the sea, it may sometimes be a great error to try to get to

land. If there be a strong "outsetting" tide, and you are swimming either by yourself or having hold of a person who cannot swim, then get on to your back and float till help comes. Many a man exhausts himself by stemming the billows for the shore on a back-going tide, and sinks in the effort, when, if he had floated, a boat or other aid might have been obtained.

9th. These instructions apply alike to all circumstances, whether the roughest sea or smooth water.—*Journal of the Royal National Lifeboat Institution, London.*

Preventatively also, it is well to know how those who can swim may best avoid the danger of drowning during their bathing. The following hints will be found of value:—

Important to Bathers.

Avoid bathing within two hours after a meal.

Avoid bathing when exhausted by fatigue or from any other cause.

Avoid bathing when the body is cooling after perspiration.

Avoid bathing altogether in the open air if, after having been a short time in the water, there is a sense of chilliness, with numbness of hands and feet; but

Bathe when the body is warm, provided no time is lost getting into the water.

Avoid chilling the body by sitting or standing undressed on the banks or in boats after having been in the water.

Avoid remaining too long in the water—leave the water immediately there is the slightest feeling of chilliness.

The vigorous and strong may bathe early in the morning on an empty stomach.

The young, and those who are weak, had better bathe two or three hours after a meal—the best time for such is from two to three hours after breakfast.

Those who are subject to attacks of giddiness or faintness, and those who suffer from palpitation and other sense of discomfort at the heart, should not bathe without first consulting their medical adviser.

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